Instruction Manual

PC 510

Bench pH/Conductivity Meter

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Rev. 3 12/03

Preface

Thank you for choosing the PC 510 pH and Conductivity bench meter series.

This manual serves to explain the use of the PC 510 bench meter. The manual functions as a step-by-step operational guide to help you familiarise with the meter's features and as a handy reference guide.

This instruction manual is written to cover as many anticipated applications and uses of the PC 510 bench meter as possible. If there are doubts in the use of the meter, please do not hesitate to contact the nearest Authorised Distributors.

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Rev. 3 12/03

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1 INTRODUCTION

Thank you for selecting the PC 510 pH and Conductivity bench meter. This step-by-step instruction manual gives you a detailed description on the use and operation of features on the meter. This PC 510 pH and Conductivity bench meter is designed to be user-friendly while providing unprecedented levels of accuracy, repeatability and reliability.

The PC 510 is an advanced microprocessor-based (ASIC - Application Specific Integrated Circuit) ideal for routine measurement that best meets discerning user's individual needs. This multi-parameter meter reads pH, mV, Conductivity, Total Dissolved Solids (TDS) and temperature (°C or °F). It has splash-proof keypad, simultaneous pH/mV/Conductivity/TDS and temperature display on a large angled custom LCD. This instruction manual is illustrated with useful hints and diagrams that show which specific key-presses to access for each function.

2 METER INFORMATION

The PC 510 meter is packaged in a corrugated box that is made of environment-friendly materials and can be re-cycled.

2.1 Meter parts

The instrument is designed to give an aesthetic look as well as ergonomic functionality. A large custom dual LCD is provided at an angle for optimum viewing. A splash-proof keypad with audible tactile response gives you a good feel of the instrument. A slide-out instruction card offers a handy reference. Listed below are the major components of the meter.

2.2 Customised LCD

The PC 510 bench meter is characterised by large dual custom LCD (Liquid Crystal Display). The display has also mode annunciators for pH, temperature, mV, conductivity and TDS readings. The secondary (lower) display shows the temperature readings simultaneously with the primary (upper) display of measured mode. Special annunciators such as graphical symbols, error messages, measurement units and modes of operation are arranged around the primary and secondary displays to give a comprehensive display. The integration of graphics and error messages into the LCD provides you a higher level of user-friendliness and easy readability.

2.3 Slide-out card

A plastic slide-out card is provided at the bottom of the PC 510 bench meter. The function of this card is to provide a quick guide to the functions of the individual keys as well as to provide a useful troubleshooting reference.

2.4 Rear instrument panel

The PC 510 bench meter provides three connectors at the rear of the meters. These connectors are labeled CON/TEMP, pH and DC.

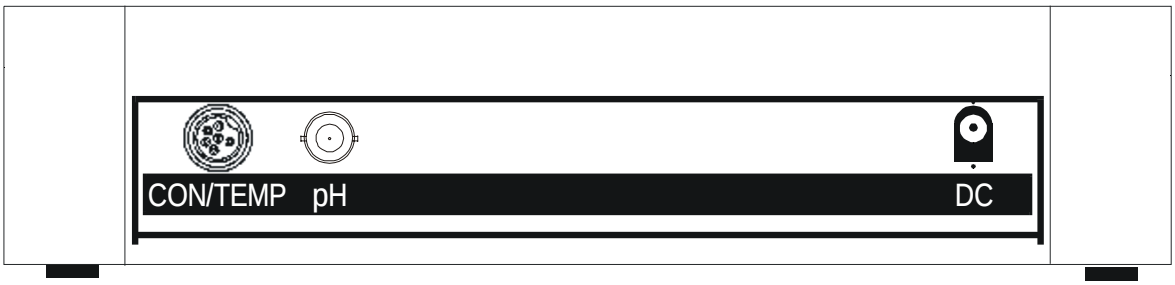


Figure 1 : View of meter rear panel

Connector	Function
CON/TEMP	For connecting 6-pins conductivity/TDS sensor with built-in temperature sensor to the meter or optional temperature probe for use with pH electrode (when applicable). Always make sure that the connector is clean and dry.
pH	For connecting pH sensor with a BNC connector to the meter. Always make sure that the connector is clean and dry.
DC	For connection to the AC power source to the power jack (DC).

2.5 AC/DC adapter

The AC/DC adapter converts the power mains voltage 120/220 VAC to low DC voltage for the PC 510 bench meter operation. Two basic models of adapters are available depending upon power supply specification of each country.

Description	Order Code	Voltage
AC Adapter 120 V	EC-120-ADA / 35615-07	110-120 V, 50-60 Hz
AC Adapter 220 V	EC-220-ADA / 35615-08	220-240 V, 50-60 Hz

2.6 Electrodes

Your meter includes two probes:

- pH electrode with BNC connector
- conductivity probe with built-in temperature sensor with a notched 6-pin connector

The temperature sensor built into the conductivity probe will also compensate for pH readings as long as both probes are in your solution at the same time.

If you want to use a “3-in-1” pH probe with a built-in temperature sensor, or if you want to use a separate temperature probe, you will need to disconnect the conductivity probe to allow for connection of the separate temperature sensor.

2.7 Electrode holder

The integral electrode holder serves as a handy holder for mounting the pH and conductivity/temperature probes during measurement or when idle.

The bench meter’s base plate has a side metal bar to which you can attach an integral swivel electrode holder. You can mount the electrode holder on either right or left side of the meter.

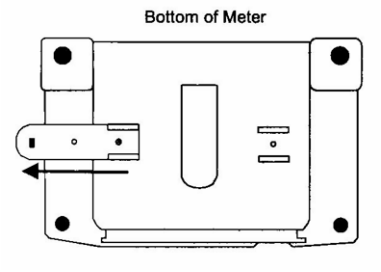


Figure 2: To position electrode arm

To position the electrode arm:

Use a Philips screwdriver to remove the screw holding the electrode holder. Slide the side metal bar until the second screw slot lines up with the original screw hole. Use the screw removed earlier to secure the electrode holder into position. Note the side metal bar is reversible. If desired, remove screw holding electrode holder base and slide out of brackets. Slide base into brackets on opposite side and tighten screws. See Figure 2.

<u>To install electrode arm to the meter:</u>

To mount the electrode arm into the metal rod on the side bar, align the slot with the metal rod and base of electrode arm. Push it downwards until it fully sits into position. Avoid using excessive force when fixing or removing. The electrode arm is ready for use.

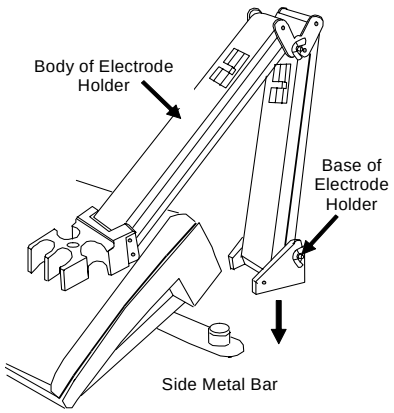


Figure 3: Installing the electrode arm

NOTE: Move the base of electrode holder if you wish to swing the electrode holder about. To prevent the meter form toppling over causing accidental spills, **DO NOT** swing the body of the electrode holder.

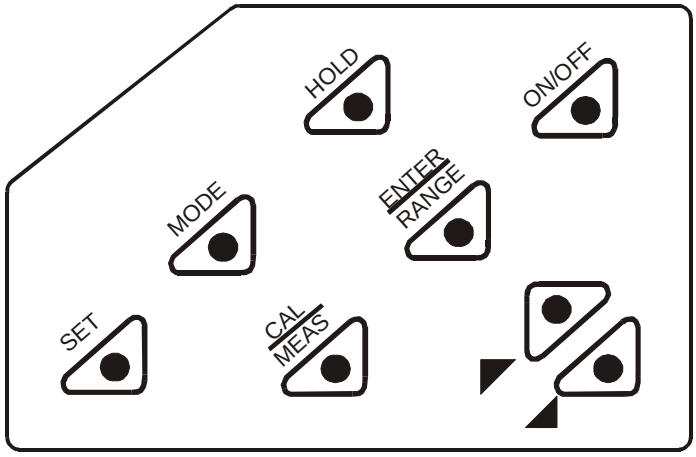


Figure 4: Keypad

ON/OFF	Powers the meter on or off. When meter is switched on, it starts in the mode the meter was last in when powered off.
SET	Enters advanced setup mode. SETUP mode lets you customise meter preferences and defaults, and view calibration and probe data.
MODE	*Measurement*: Press MODE to toggle between pH, mV, conductivity and TDS. *Calibration*: In calibration mode, press MODE to access temperature calibration.
HOLD	Freezes the measured reading. To activate, press HOLD while in measurement mode. To release, press HOLD again. Note: When auto endpoint feature is switched on, meter automatically holds reading after 5 seconds of stability. The HOLD indicator appears on the display. Press HOLD to release auto endpoint feature.
CAL/MEAS	Toggles between Calibration and Measurement mode. Example: If you are in pH measurement mode, press CAL/MEAS to enter pH calibration mode. Note: Temperature calibration is available from pH, TDS or Conductivity calibration mode. In Setup mode: Press CAL/MEAS to return to main menu from sub menus. Press CAL/MEAS again to return to measurement mode from main menu.
ENTER/RANGE	ENTER: Press to confirm values in Calibration mode and to confirm selections in Setup mode. RANGE: Press to switch to manual ranging in Conductivity or TDS mode.
▲	Press ▲ in Setup mode to scroll up through subgroups. Also lets you increase the values in the conductivity, TDS and temperature calibration modes.
▼	Press ▼ in Setup mode to scroll down through subgroups. Also lets you decrease the values in the conductivity, TDS and temperature calibration modes.

3.2 Display

The PC 510 features a large dual display that shows the measured parameter in the primary display, plus temperature in °C or °F in the secondary display. It also features mode annunciators that describe the meter's functions.

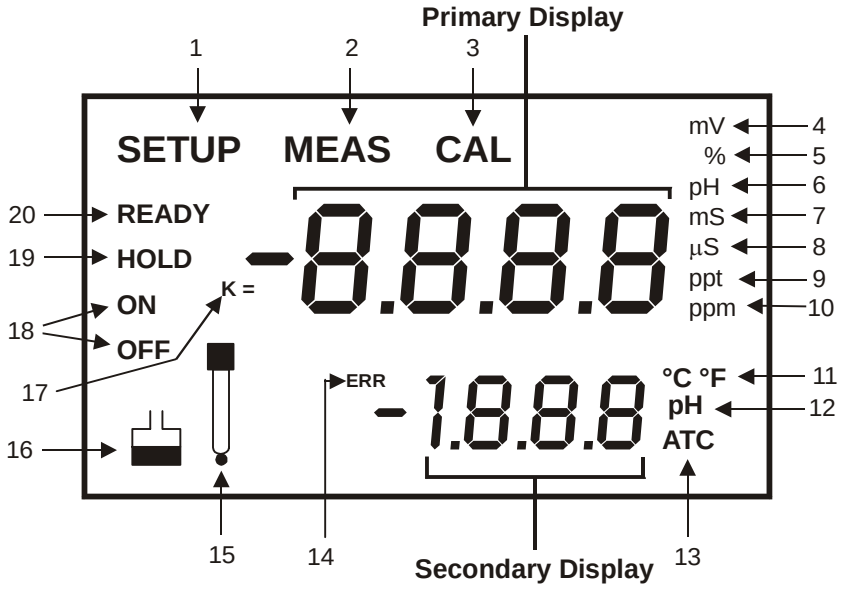


Figure 5: Full LCD Screen

1. SETUP mode indicator
2. MEASurement mode indicator
3. CALibration indicator
4. mV indicator
5. % indicator
6. pH measurement indicator
7. milli-Siemens indicator
8. micro-Siemens indicator
9. parts per thousand indicator
10. parts per million indicator
11. temperature indicator
12. pH indicator
13. Automatic Temperature Compensation (ATC) indicator
14. ERRor indicator
15. probe indicator
16. calibration solution indicator
17. cell constant indicator
18. ON/OFF indicator
19. HOLD indicator
20. READY indicator

4 PREPARATION

4.1 Connecting the Sensor Electrode

4.1.1 To connect the pH electrode:

1. Slide the BNC connector of the probe over the BNC connector socket on the meter. Make sure the slots of the connector are in line with the posts of the socket. Rotate and push the connector clockwise until it locks.
2. To remove electrode, push and rotate the connector anti-clockwise. While holding onto the metal part of connector, pull it away from the meter

NOTE: *Keep connector dry and clean. Do not touch connector with soiled hands.*

CAUTION: *Do not pull the probe cord or the probe wires might disconnect.*

4.1.2 To connect the conductivity/temperature probe:

1. Line up the notch and 6-pins on the probe connector with the holes in the connector located on the top of the meter. Push down and screw the metal sleeve to lock the probe connector into place. See Figure 1 on page 1 for the meter rear panel view.
2. To remove probe, unscrew the metal sleeve and slide up the probe connector. While holding onto the metal sleeve, pull probe away from the meter.

NOTE: *Follow the same directions to connect an optional separate temperature element.*

Keep connector dry and clean. Do not touch connector with soiled hands.

CAUTION: *Do not pull on the probe cord or the probe wires might disconnect.*

4.2 Connecting the A.C. Adapter

1. Before plugging in the A.C. adapter, switch off the meter and the power source of the A.C. adapter. This is a safety precaution that should be adhered to safeguard your meter.
2. The A.C. adapter should have the following settings:

   Output voltage: 9 V D.C.
   Current: 500 mA

NOTE: *Ensure that the input mains voltage (110/220/240 V) matches your adapter requirements.*

3. Insert the D.C. jack into the socket at rear panel of the meter as shown in Figure 1on page 1.
4. Switch on the power to the adapter, followed by the meter.

5 CALIBRATION

5.1 Important information on meter calibration

When you calibrate your meter, old calibration points are replaced on a “point by point” basis in pH, and on a “range by range” basis in conductivity or TDS.

For example:

- **pH:** if you previously calibrated your meter at pH 4.01, 7.00 and 10.01, and you recalibrate at pH 7.00, the meter retains the old calibration data at pH 4.01 and pH 10.01.
- **Conductivity:** if you previously calibrated your meter at 1413 µS in the 0 to 1999 µS range and you recalibrate at 1500 µS (which is also in the 0 to 1999µS range), the meter will replace the old calibration data (1413 µS) in that range. The meter will retain all calibration data in other ranges.
- **TDS:** If you previously calibrated your conductivity meter at 300 ppm in the 0 to 999 ppm range and you re-calibrate at 500 ppm (which is also in the 0 to 999 ppm), the meter will replace the old calibration data (300 ppm) in that range. The meter will retain all calibration data in other ranges.

To view current calibration points:

- **pH:** Program P1.0 in the SETUP section 8.2 page 38.
- **Conductivity & TDS:** Program P5.0 in the SETUP section, page 32.

To completely recalibrate your meter, or when you use a replacement probe, it is best to clear old calibration data by resetting the meter.

To reset the meter to its factory defaults:

- **pH:** Program P4.0 in the SETUP section, page 32.
- **Conductivity & TDS:** Program P9.0 in the SETUP section, page 38.

NOTE: *Resetting the meter will set meter to factory defaults. Conductivity and pH must be reset separately.*

For directions on how to calibrate your meter:

- See section 5.3 on page 7 for pH calibration
- See section 5.4 on pages 9 for conductivity calibration
- See section 5.5 on page 11 for TDS calibration

5.2 Preparing the meter for calibration

Before starting calibration, make sure you are in the correct measurement mode. When you switch on the meter, the meter starts up in the measurement mode you shut it off in. For example, if you shut the meter off in pH measurement mode, the meter will be in the pH measurement mode when you switch the meter on.

Do not re-use calibration solutions after calibration. Contaminants in the solution can affect the calibration, and eventually the accuracy of the measurements. See section 13 on “Accessories” on page 44 for information on our high quality calibration solutions.

5.3 pH calibration

NOTE: *We recommend that you perform at least a 2-point calibration using standard buffers that bracket (one above and one below) the expected sample range.*

5.3.1 Preparing for pH calibration

This meter is capable of up to 5-point pH calibration to ensure accuracy across the entire pH range of the meter. Select from the following buffer options:

- USA: pH 1.68, 4.01, 7.00, 10.01 and 12.45
- NIST: pH 1.68, 4.01, 6.86, 9.18 and 12.45

The meter automatically recognises and calibrates to these standard buffer values, which makes pH calibration faster and easier.

NOTE: *Selection of USA or NIST buffer standards must be done prior to calibration. Refer to Section 8.4 on P3.3 on page 29.*

5.3.2 Before starting

Be sure to remove the protective electrode storage bottle or rubber cap of the probe before calibration or measurement. If the electrode has been stored dry, hydrate the probe in tap water for 10 minutes before calibrating or taking readings to saturate the pH electrode surface and minimise drift.

Wash your probe in de-ionised water after use, and store in electrode storage solution. If storage solution is not available, use pH 4.01 or 7.00 buffer for short term storage. DO NOT store electrode in distilled or de-ionised water.

5.3.3 To calibrate pH

1. If necessary, press the MODE key to select pH mode. The pH indicator appears in the upper right hand corner of the display.
2. Rinse the probe thoroughly with de-ionised water or rinse solution. Do not wipe the probe as this causes a build-up of electrostatic charge on the glass surface.
3. Dip the probe into the standard calibration buffer. The end of the probe must be completely immersed into the sample. Stir the probe gently to create a homogeneous sample.

NOTE: *The temperature element is in the conductivity cell. For temperature compensated readings, dip the conductivity cell or ATC probe into the calibration buffer as well.*

4. Press CAL/MEAS to enter pH calibration mode. The CAL indicator will be shown. The primary display will show the measured reading while the smaller secondary display will indicate the pH standard buffer solution.
5. Wait for the measured pH value to stabilise. If the READY indicator has been activated through the Setup, the READY appears when the reading is stable.
6. Press ENTER to confirm calibration. The meter is now calibrated to the current buffer. The lower display automatically scrolls through the remaining buffer options.
    - If you are performing multi-point calibration, go to step 7.

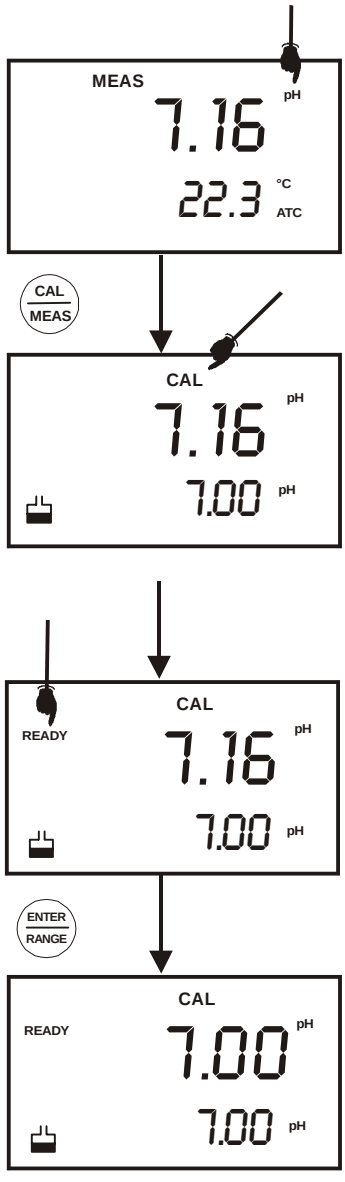


Figure 6: pH calibration

- If you are performing one-point calibration, go to step 9.

7. Rinse the electrode with de-ionised water or rinse solution, and place it in the next pH buffer.
8. Follow steps 5 to 7 for additional calibration points.
9. When calibration is complete, press CAL/MEAS to return to pH measurement mode.

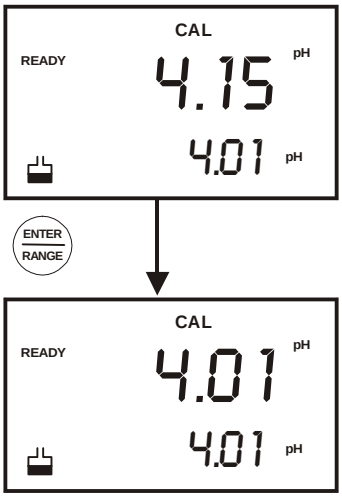


Figure 7: Next point calibration for pH 4.01

NOTE: *To exit from pH calibration mode without confirming calibration, DO NOT press ENTER in step 6. Press CAL/MEAS instead.*

If the selected buffer value is not within ±1.0 pH from the measured pH value: the electrode and buffer icon blink and the ERR annunciator appears in the lower left corner of the display.

To limit the number of pH buffer values available during calibration, see section 8.4 Setup P3.2 on page 29.

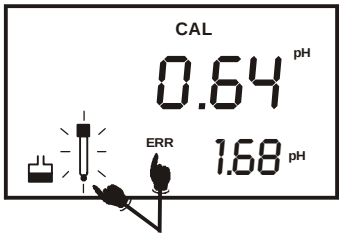


Figure 8: Err message and electrode icon will appear if incorrect buffer is used

5.4 Conductivity/TDS calibration

The PC 510 has 5 measuring ranges. You can calibrate 1 point each of the measuring ranges (up to 5 points). If you are measuring values in more than 1 range, make sure to calibrate each of the ranges you are measuring. All new calibration data will over-ride existing stored calibration data for each measuring range you calibrate.

- If you are measuring in ranges near to or greater than 20 mS (10 ppt), or near to or lower than 100 µS (50 ppm), calibrate the meter at least once a week to get specified ±1% Full Scale accuracy.
- If you are measuring in the mid-ranges and you washed the probe in de-ionised water and stored it dry, calibrate the meter at least once a month.
- If you take measurements at extreme temperatures, calibrate the meter at least once a week.

5.4.1 Preparing for conductivity/TDS calibration

For best results, select a standard value close to the sample value you are measuring. Alternatively, use a calibration solution value that is approximately 2/3 the Full-Scale value of the measurement range you plan to use. For example, in the 0 to 1999 µS conductivity range, a 1413 µS solution is a good solution for calibration.

See the table below for recommended calibration solution ranges.

Range Indicator	Conductivity Range	Recommended Calibration Solution Range	TDS Range	Recommended Calibration Solution Range
r 1	0.00 to 19.99 µS	6.00 to 17.00 µS	0.00 to 9.99 ppm	3.00 to 8.50 ppm
r 2	0.0 to 199.9 µS	60.0 to 170.0 µS	10.0 99.9 ppm	30.0 to 85.0 ppm
r 3	0 to 1999 µS	600 to 1700 µS	100 to 999 ppm	300 to 850 ppm
r 4	0.00 to 19.99 mS	6.00 to 17.00 mS	1.00 to 9.99 ppt	3.00 to 8.50 ppt
r 5	0.0 to 199.9 mS	60.0 to 170.0 mS	10.0 to 200 ppt	30.0 to 170.0 ppt

Calibration Solution Ranges

Temperature Coefficient: These meters are factory set to a temperature coefficient of 2.1 % per °C. For most applications this will provide good results. See Program P8.1 on page 37 to set the temperature coefficient to different value. See Addendum 2, “Calculating Temperature Coefficients” to determine the appropriate temperature coefficient for your solution.

Normalisation Temperature: The factory default value for normalisation temperature is 25 °C. If you need to normalise to a value other than 25 °C, see Program P8.2 on page 38.

Do not reuse calibration solutions after calibration. Contaminants in the solution can affect the calibration, and eventually the accuracy of the measurements. Use fresh calibration solution each time you calibrate your meter.

All new calibration data will over-ride existing stored calibration data for each measuring range calibrated.

Calibrating for Conductivity:

1. If necessary, press the MODE key to select conductivity mode.
2. Rinse the probe thoroughly with de-ionised water or a rinse solution, then rinse with a small amount of calibration standard.
3. If necessary, ensure that the probe's yellow probe guard is attached. Dip the probe into the calibration standard. Immerse the probe tip beyond the upper steel band. Stir the probe gently to create a homogeneous sample.
4. Wait for the measured conductivity value to stabilise. If the READY indicator has been activated (SETUP program P7.1 – see page 31), the READY annunciator lights when the reading is stable.
5. Press CAL/MEAS to enter conductivity or TDS calibration mode. The CAL indicator will appear in the upper right corner of the display.
6. Press the ▲ or ▼ key to change the value on the primary display to match the value of the calibration standard.
7. Press ENTER to confirm calibration value. The meter returns to the MEAS (measurement) mode.
8. Repeat steps 1 to 7 for other measuring ranges.

NOTES: *When entering calibration mode, the meter will display the factory default value. If the meter was previously calibrated, the display may "jump" to the factory default / uncalibrated value when switching from measurement to calibration mode.*

To exit from Conductivity calibration mode confirming calibration, DO NOT press the ENTER key in step 7. Press CAL/MEAS instead. This will retain the meter's old calibration data in the measuring range of the calibration.

You can offset the conductivity reading up to ±40% from default setting. If your measured value differs by more than ±40% clean or replace probe as needed, or use a calibration standard with a higher value as required.

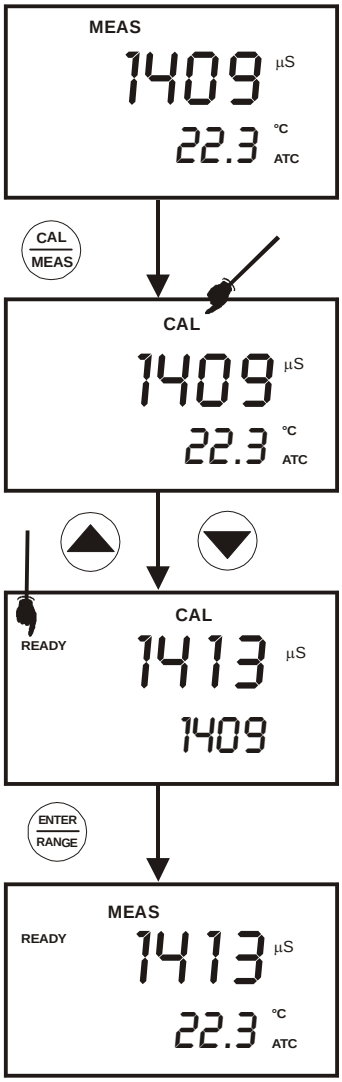


Figure 9: Conductivity calibration

A wide selection of high-quality calibration standards is available. See page 44 for more information.

5.5 TDS Calibration

5.5.1 Calibrating for TDS directly

The factory default setting for TDS conversion factor is 0.5. If your solution has a different TDS factor, you can improve calibration accuracy by setting the TDS factor prior to calibration. See Program P7.4 on page 36 for directions.

1. If necessary, press the MODE key to select TDS mode.
2. Rinse the probe thoroughly with de-ionised water or a rinse solution, then rinse with a small amount of calibration standard.
3. If necessary, ensure that the probe's yellow probe guard is attached. Dip the probe into the calibration standard. Immerse the probe tip beyond the upper steel band. Stir the probe gently to create a homogeneous sample. Allow time for the reading to stabilise.
4. Press the CAL/MEAS to enter TDS calibration mode. The CAL indicator will appear in the upper right corner of the display.
5. Press the ▲ or ▼ key to change the value on the primary display to match the value of the calibration standard.
6. Press ENTER to confirm the calibration value. The meter returns to the MEAS (measurement) mode. See Figure 10.
7. Repeat steps 1 to 6 for other measuring ranges.

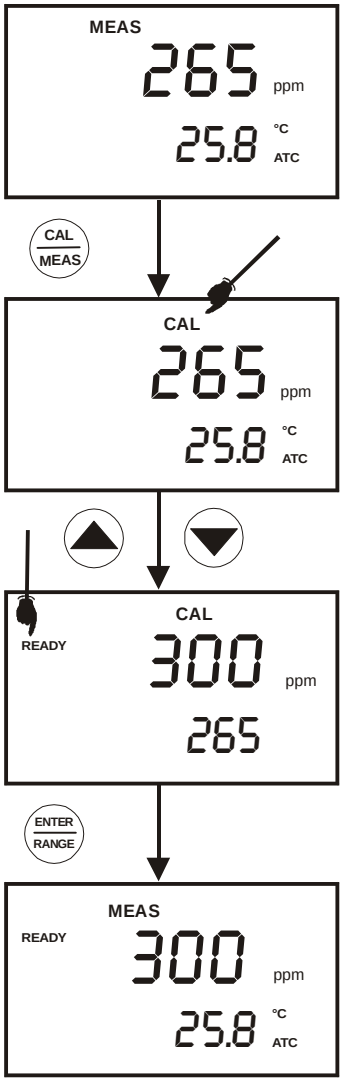


Figure 10: TDS calibration

NOTES:

To exit from TDS Calibration mode without confirming calibration, DO NOT press ENTER key in step 6. Press CAL/MEAS instead. This will retain the meter's old calibration data in the measuring range of the calibration. You can offset the TDS reading up to ±40% from the default setting. If your measured value differs by more than ±40%, clean or replace probe as needed, or use a calibration standard with a higher value as required.

5.6 Calibration with Conductivity Standard and TDS factor

The concentration of salts dissolved in solution increases the conductivity of that solution. This relationship varies from salt to salt and is roughly linear over a given range for a given salt.

The TDS conversion factor is the number used by the meter to convert from conductivity to TDS.

Instead of calibrating for TDS directly (described above), you can calibrate the PC 510 bench meter by:

1. Calibrating to conductivity standards (as described above) and then
2. Entering the appropriate TDS conversion factor into the meter.

To determine the conductivity to TDS conversion factor for your solution:

- Addendum 1 on page 47 lists some commonly used conversion factors.
- Addendum 2 on page 48 describes how to calculate the TDS conversion factor for other solutions.

Enter the TDS conversion factor into your meter as described under Section 8.8, in Program P7.4, Setting the TDS Factor on page 36.

5.7 Temperature Calibration

The conductivity electrode (EC-CONSEN91W / 35608-50) supplied has a built-in temperature sensor. Alternatively, a separate temperature sensing element can be used (such as temperature probe EC-WPPHTEM-01W / 35618-05), or a "3-in-1" pH/Temperature combination electrode with ATC connection.

The conductivity probe is factory calibrated. Temperature calibration is recommended only if you suspect temperature errors may have occurred over a long period of time, or if you have a replacement probe.

Temperature calibration is accessible during pH, conductivity or TDS calibration.

Temperature Calibration

1. Make sure the conductivity electrode, or temperature probe, or "3-in-1" electrode is attached to the 6-pin connector.
2. Switch the meter on.
3. Press the CAL/MEAS key to enter calibration mode (either from pH or conductivity mode). The CAL indicator will appear above the primary display.
4. While in pH (or conductivity or TDS) calibration mode, press the MODE key to enter temperature calibration mode. The primary display shows the last set temperature value and the secondary display shows the temperature reading with zero offset.
5. Dip the ATC probe into a solution of known temperature (i.e. a temperature bath). Allow time for the temperature probe to stabilise.
6. Scroll with the ▲ or ▼ key to set the correct temperature value (i.e. the temperature of the temperature bath). You can adjust the reading by 0.1 °C or °F increments.
7. Once you have selected the correct temperature press the ENTER key.

   The meter automatically returns to measurement mode.

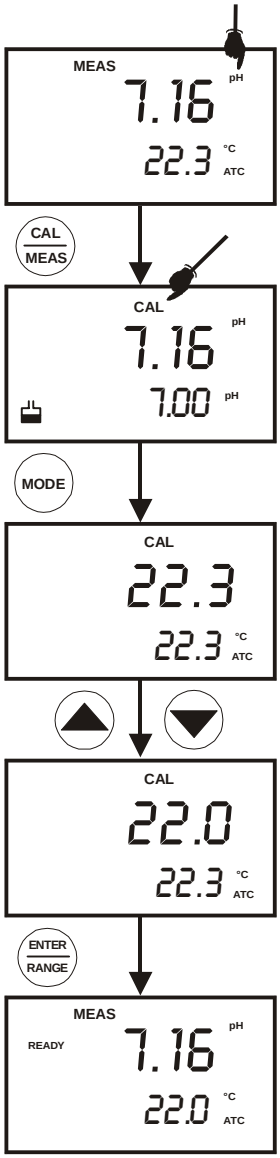


Figure 12: Temperature calibration in pH mode

NOTES:

- You can offset the temperature reading up to ±5° from default reading.
- To exit this program without confirming the temperature calibration value, DO NOT press ENTER, press CAL/MEAS in step 7 instead.

6 MEASUREMENT

6.1 Taking pH Measurements

6.1.1 Automatic Temperature Compensation

Automatic Temperature Compensation only occurs when a temperature sensing element is plugged into the meter.

Temperature sensing element refers to the following probes made specifically for this meter. See accessories for ordering information

- *The conductivity electrode with a built-in temperature sensor*
- *Temperature probe; or*
- *The 3-in-1 pH/Temperature combination electrode.*

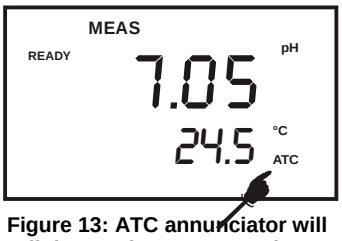


Figure 13: ATC annunciator will light up when connected to temperature probe

If there is no temperature sensor plugged into the meter, the default manual temperature setting is automatically 25 °C. You can manually set the temperature to match your working conditions using a separate thermometer.

For automatic temperature compensation (ATC) simply plug the temperature probe into the meter (see page 5 for directions). The ATC indicator will light up on the LCD. See Figure 13.

NOTE: *The temperature sensing element must be submersed in the liquid you are measuring.*

6.1.2 Manual Temperature Compensation (pH)

IMPORTANT: For manual compensation, you must disconnect the temperature probe (see page 5 for instructions).

1. Switch the meter on. Press MODE key to select pH mode.
2. Press the CAL/MEAS key to enter pH calibration mode. The CAL indicator will appear above the primary display.
3. While in pH calibration mode, press the MODE key to enter temperature calibration mode. The primary and secondary displays show the last set temperature value.
4. Check the temperature of your sample using an accurate thermometer.
5. Press the ▲ or ▼ key to set the temperature to the measured value from step 4.
6. Press ENTER to confirm the selected temperature and to return to the pH measurement mode.

See Figure 14.

The meter will now compensate pH readings for the manually set temperature.

NOTES: *To exit this program without confirming the manual temperature compensation value, DO NOT press ENTER in step 6. Press CAL/MEAS instead.*

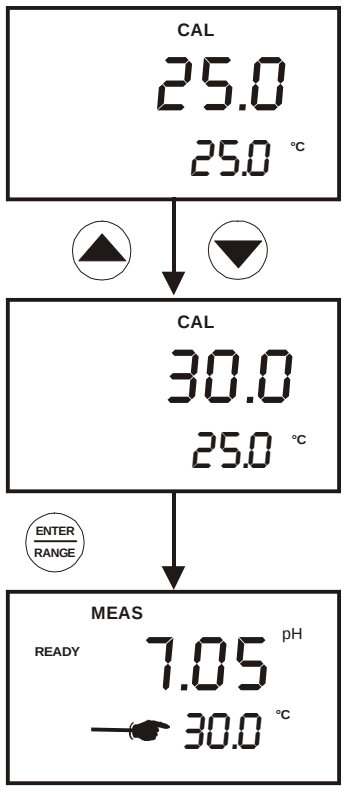


Figure 14: Manual temperature compensation

6.1.3 Taking pH Measurements

Be sure to remove the electrode storage bottle or protective rubber cap on the electrode before measurement.

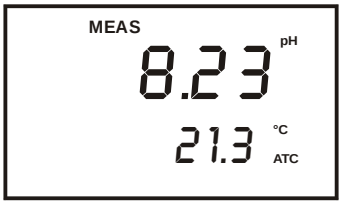


Figure 15: Measurement mode

To take readings:

1. Rinse the pH electrode with de-ionised or distilled water before use to remove any impurities adhering to the probe body. If the pH electrode has dehydrated, soak it for 30 minutes in electrode storage solution or 2M – 4 M KCL solution (sold separately).
2. Press ON to switch meter on.
3. Press the MODE key to select pH measurement mode. The MEAS annunciator appears on the top center of the LCD. The ATC indicator appears in the lower right-hand corner to indicate Automatic Temperature Compensation.

NOTE: *For pH manual temperature compensation, you must disconnect the conductivity cell from the 6-pin connector. The ATC indicator will disappear form the display. You also need to set a manual temperature compensation value. See Section 6.2.2: Manual Temperature Compensation on page 16.*

4. Dip the probe into the sample. Since the conductivity cell contains the temperature sensor, make sure it is also immersed in your solution.

When dipping the probe into the sample, the sensor or the glass bulb of the electrode must be completely immersed into the sample. Stir the probe gently in the sample to create a homogeneous sample.

5. Allow time for the reading to stabilise. Note the reading on the display. If the READY indicator is selected on, it will appear when the reading is stable. See below for more information.

Taking measurements with READY indicator selected on

If the READY indicator has been activated, the READY annunciator lights when the reading is stable *. *Switch the READY indicator on or off in SETUP program P3.1. See page 28 for directions.*

** The READY indicator appears and the reading holds until the measured value exceeds the tolerance (±0.02 pH; +0.8 mV < 400; ±1.2 mV > 400). Then READY annunciator turns off.*

Taking measurements with the auto endpoint feature selected on

When a reading is stable for more than 5 seconds, the auto endpoint feature will automatically “HOLD” the reading. The “HOLD” indicator appears on the left side of the display. Press the HOLD key to release the reading. Switch the Auto endpoint feature on or off in SETUP program P3.1, see page *28* for instructions.

6.2 Taking Conductivity or TDS Measurement

6.2.1 Automatic Temperature Compensation

For automatic temperature compensation (ATC), simply plug the conductivity probe into the meter (see page 5 for directions). The ATC indicator will light on the LCD.

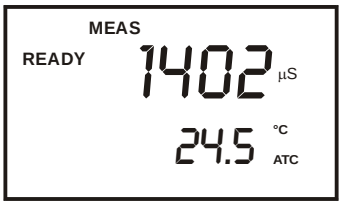


Figure 16: ATC annunciator will light up when connected to temperature probe

NOTE: *If the ATC indicator does not light, manual temperature compensation may be selected in the meter’s SETUP mode. See Program P7.3 on page 35 for directions on selecting Automatic Temperature Compensation.*

6.2.2 Manual Temperature Compensation

IMPORTANT: For manual compensation, you must deactivate the temperature probe.

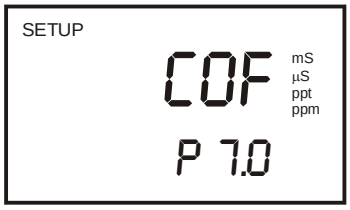


Figure 17: P7.0 configuration setup for conductivity & TDS

Selecting Manual Temperature Compensation for conductivity

Selecting between Automatic Temperature Compensation (ATC) and Manual Temperature Compensation in the SETUP program P7.3 on page 35. Meter default is ATC on.

From Conductivity or TDS measurement mode

1. Press SETUP key to enter Setup mode.
2. Press the ▲ or ▼ key to scroll through subgroups until you view parameter P7.0. See Figure 17.
3. Press ENTER key three times to select parameter 7.3. The upper display shows “ATC” and the lower display shows “P7.3”.
4. Press ENTER key again. The upper display shows “ATC” and the lower display shows “YES” or “NO”.
5. Press the ▲ or ▼ key to select the Automatic Temperature Compensation feature on (ATC) or off (ATC off). See Figure 14.
6. Press ENTER key to confirm selection and to return to the subgroup menu. Press the CAL/MEAS key to return to measurement mode.

Note that the ATC indicator no longer appears on the display.

Proceed to the next section to select a manual temperature compensation value.

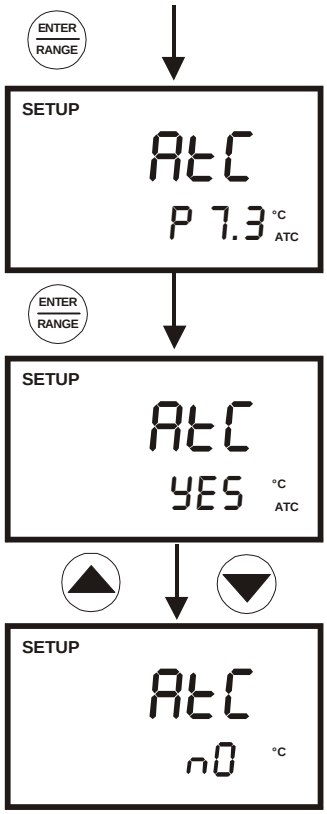


Figure 18: Turning ATC feature ON or OFF

6.2.3 Setting a manual temperature compensation value

To use manual temperature compensation, you need to enter the temperature value of your process into the meter. This is the value at which reading will manually temperature compensate. You can select any temperature between 0 and 100 °C (32 to 212 °F). Default value is 25 °C (77 °F).

To select a manual temperature compensation value

1. Switch the meter on. Press the MODE key to select conductivity or TDS measurement mode.
2. If necessary, select ATC off as described in P7.3 on page 35. The ATC indicator will not appear on the display.
3. Press the CAL/MEAS key to enter conductivity or TDS calibration mode. The CAL indicator will appear above the primary display.
4. While in conductivity (or TDS) calibration mode, press the MODE key to enter temperature calibration mode. The primary and secondary displays show the last set temperature value.
5. Check the temperature of your sample using an accurate thermometer.
6. Press the ▲ or ▼ key to offset the temperature to the measured value from step 5.
7. Press ENTER to confirm the selected temperature and to return to the conductivity measurement mode. See Figure 18.

The meter will now compensate conductivity or TDS readings for manually set temperature.

NOTES: *To exit this program without confirming the manual temperature compensation value, DO NOT press ENTER in step 7. Press CAL/MEAS instead.*

Setting the manual temperature compensation value for conductivity will change the manual temperature compensation value for pH to the same value, and vice versa.

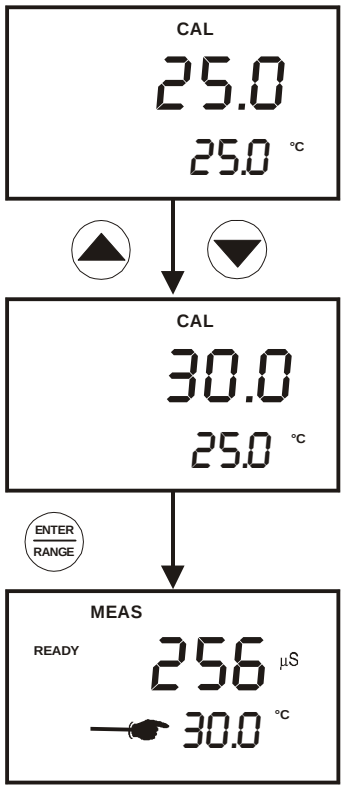


Figure 19: Manual Temperature Compensation

6.2.4 Taking Measurements (Conductivity or TDS)

To take readings:

1. Rinse the probe with de-ionised or distilled water before use to remove any impurities adhering to the probe body. Shake or air dry. To avoid contamination or dilution of your sample, rinse probe with a small volume of your sample liquid.
2. Press ON to switch meter on.
3. Press the MODE key to select conductivity or TDS measurement mode. The MEAS annunciator appears on the top center of the LCD. The ATC indicator appears in the lower right hand corner to indicate Automatic Temperature Compensation.

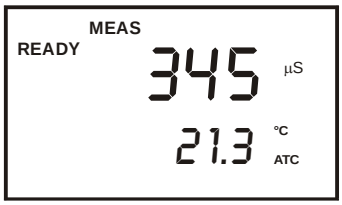


Figure 20: During measurement

NOTE: *For conductivity manual temperature compensation, you must de-activate the temperature sensor built into the conductivity probe and set a manual temperature compensation. See page 14 for more information. The ATC indicator will disappear from the display.*

4. If necessary, ensure that the probe's yellow probe guard is attached. Dip the probe into the sample. When dipping the probe into the sample, take care to ensure that the liquid level is above its upper steel band. Stir the probe gently in the sample to create a homogeneous sample.

5. Allow time for the reading to stabilise. Note the reading on the display. If the READY indicator is selected on, it will appear when the reading is stable. See Program P7.1 on page 34 for more information.

6. Press the MODE key to toggle between conductivity, TDS and pH readings.

NOTE: *You can use the Conductivity Manual Ranging function to manually select a specific range in which your readings will appear. See page 19 for directions.*

Taking measurements with READY indicator on

If the READY indicator has been activated, the READY annunciator lights when the reading is stable *. Switch the READY indicator on or off in SETUP program P7.1. See page 34 for directions.

Taking measurements with the auto endpoint feature selected on

When a reading is stable for more than 5 seconds, the auto endpoint feature will automatically "HOLD" the reading. The "HOLD" indicator appears on the left side of the display. Press the HOLD key to release the reading. Switch the Auto endpoint features on or off in SETUP program P7.1, see page 34 for instructions.

6.2.5 Using Auto and Manual Ranging Function (for conductivity & TDS)

Auto-ranging

Your meter automatically selects the range in which your readings appear. For example:

1. Dip the conductivity probe into a standard solution, say, 12.88 mS.

2. It will automatically select the most appropriate range, r 4, which is 0.00 to 19.99 mS.

3. The secondary display on the LCD will momentarily display r 4 before it switches to measured temperature value.

4. The primary display will show the actual conductivity value. See Figure 20.

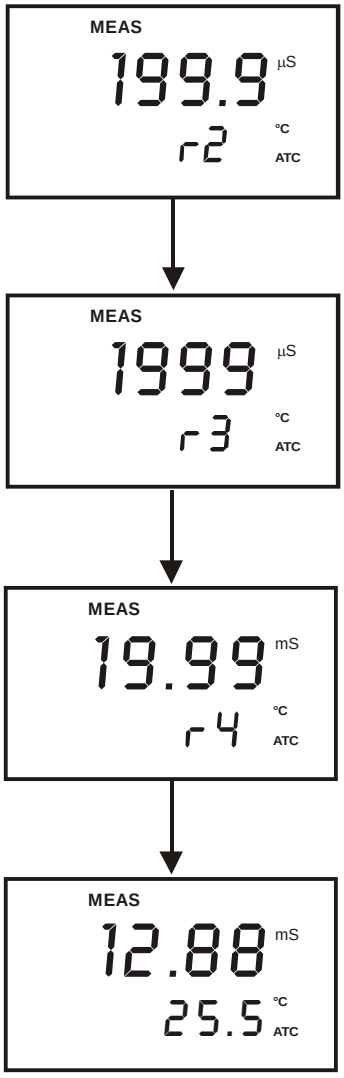


Figure 21: Auto-ranging feature

Manual-ranging

The manual ranging function lets you select the specific range you want to work in. Refer to page 9 for the table of range.

1. To select the desired measuring range manually, press the RANGE key while in measurement mode. The meter will lock on to the appropriate range and the “MEAS” indicator blinks.
2. Press RANGE key again (if needed) until desired range is selected.
3. To re-select the Auto-ranging function, repeatedly press the RANGE key until the “MEAS” indicator appears without blinking.

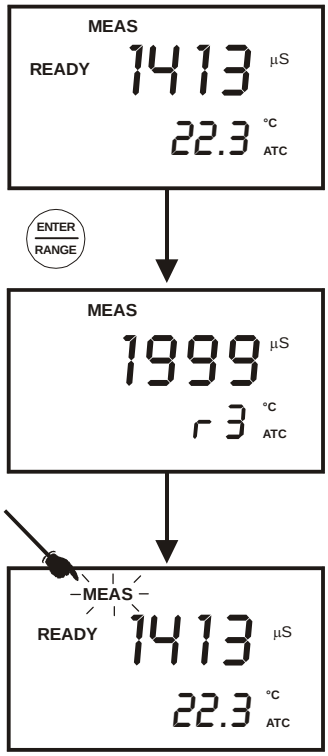


Figure 22: Manual ranging

NOTES:

The meter will not let you manually select a range in which the reading will be over-range.

The meter resets to the Auto-ranging function once it is turned off. You will have to reset the manual ranging function each time you turn the meter off.

7 HOLD FUNCTION

This feature lets you freeze the display for a delayed observation. HOLD can be used any time in MEAS mode.

1. To hold a measurement, press the HOLD key while in measurement mode. “HOLD” will appear on the display.
2. To release the held value, press the HOLD key again. Continue to take measurements

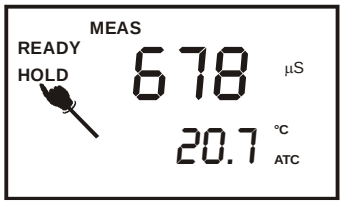


Figure 23: HOLD function

NOTE:

- *If the meter is shut off manually, the HOLD value will be lost.*
- *Your meter has an auto endpoint feature. When this feature is switched on, and when a reading is stable for more than 5 seconds, the display will automatically “HOLD” the reading. The “HOLD” indicator appears. Press the HOLD key to release the reading. To switch on or off the auto endpoint feature, see SETUP Program P3.1 on page 28 for pH and SETUP Program P7.1 on page 34 for conductivity/TDS.*

8 ADVANCED SETUP FUNCTIONS

The advanced setup mode lets you customise your meter’s preferences and defaults. The PC 510 bench meter features different sub-groups that organise setup parameters.

The sub-groups are:

	For pH		**For Conductivity & TDS**
P1.0	View calibration data (CAL)	P5.0	View calibration data (CAL)
P2.0	View electrode data (ELE)	P6.0	View electrode data (ELE)
P3.0	Unit Configuration (COF)	P7.0	Unit Configuration (COF)
P4.0	Reset to factory default settings (rSt)	P8.0	Temperature (tPr)
		P9.0	Reset to factory default settings (rSt)

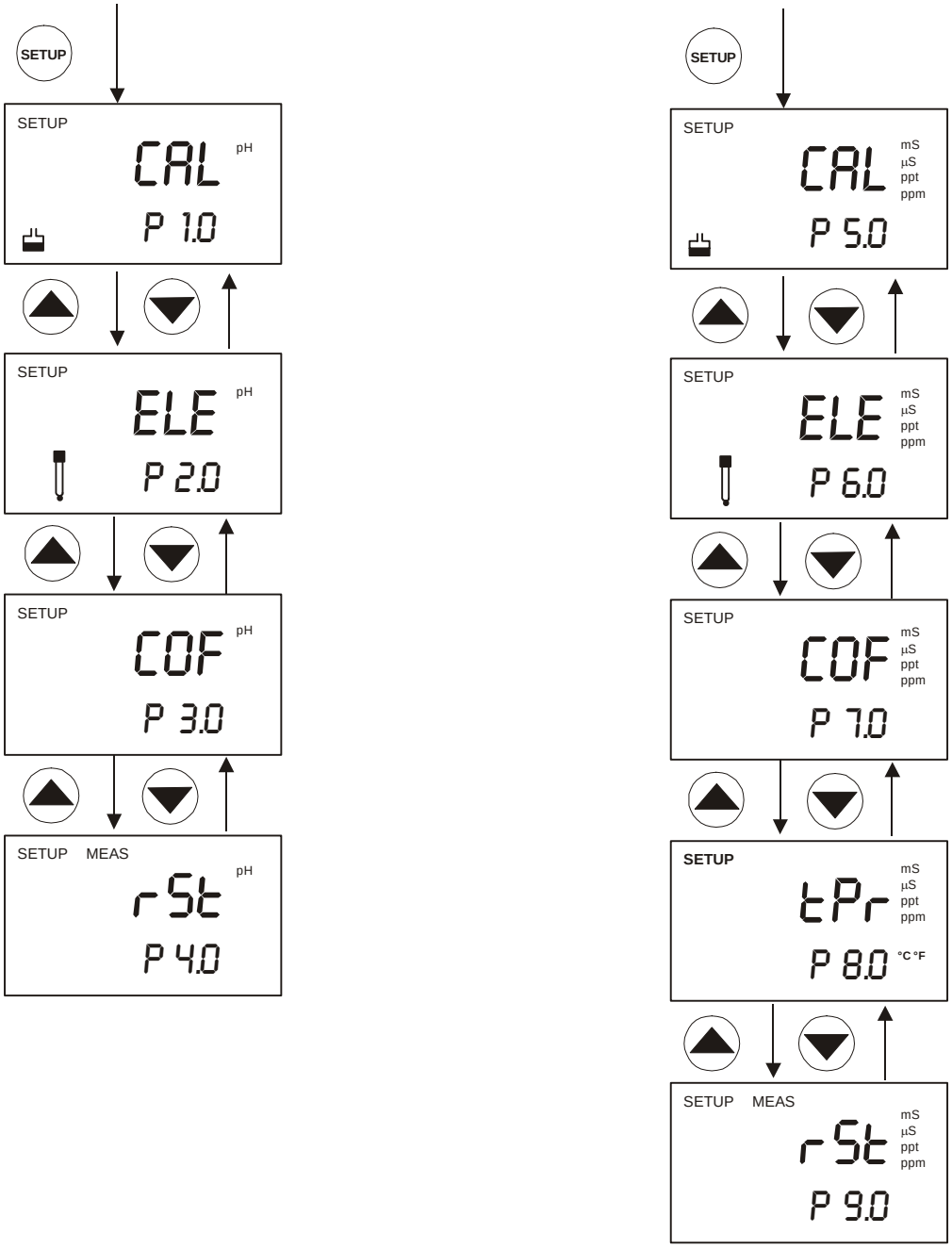


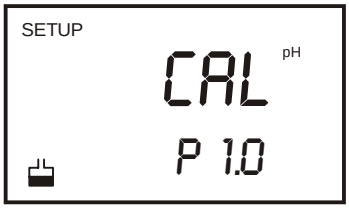
Figure 24: Overall view of SETUP programs for pH (on left) & conductivity/TDS (on right)

8.1 Advanced SETUP mode Overview

1. In either pH or Conductivity measurement mode, press the SETUP key to enter Setup mode.
2. Press the ▲ or ▼ key to scroll through sub-groups.
3. Press ENTER key to enter a particular parameter.

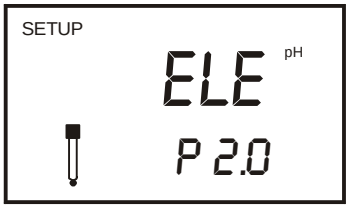
See Addendum 4 on page 49 for a table of meter factory default settings.

SETUP in pH measurement mode



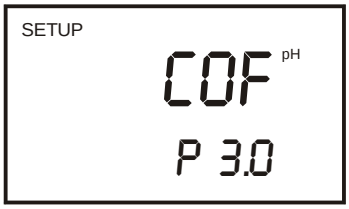
P1.0: View previous calibration data

P1.1 First calibration point (pH 1.68)
P1.2 Second calibration point (pH 4.01)
P1.3 Third calibration point (pH 7.00 or 6.86)
P1.4 Fourth calibration point (pH 10.01 or 9.18)
P1.5 Fifth calibration point (pH 12.45)



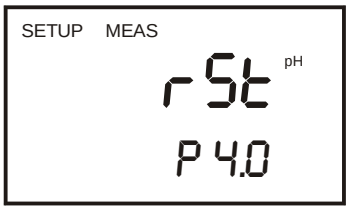
P2.0: View electrode data

P2.1: pH electrode offset
P2.2: pH electrode slope



P3.0: Unit Configuration

P3.1 READY indicator and auto endpoint function – select on or off
P3.2 Number of pH calibration points: 2, 3, 4 or 5
P3.3 Select USA or NIST buffer set
P3.4 Select °C or °F



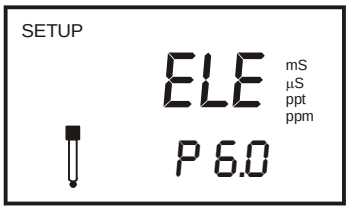
P4.0: Reset to factory defaults

P4.0 Reset meter to factory defaults

SETUP in Conductivity Measurement Mode

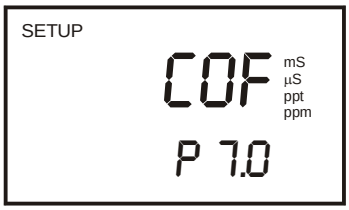
P5.0: View previous calibration data

P5.1 First range calibration point (0.00 – 19.99 µS)
P5.2 Second range calibration point (0.0 – 199.9 µS)
P5.3 Third range calibration (0 – 1999 µS)
P5.4 Fourth range calibration point (0.00 – 19.99 mS)
P5.5 Fifth range calibration point (0.0 – 199.9 mS)



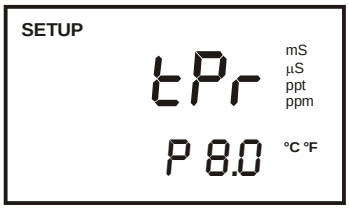
P6.0: View electrode data

P6.1 Effective cell constant for first range (0.00 – 19.99 µS)
P6.2 Effective cell constant for second range (0.0 – 199.9 µS)
P6.3 Effective cell constant for third range (0 – 1999 µS)
P6.4 Effective cell constant for fourth range (0 – 19.99 mS)
P6.5 Effective cell constant for fifth range (0.0 – 199.9 mS)



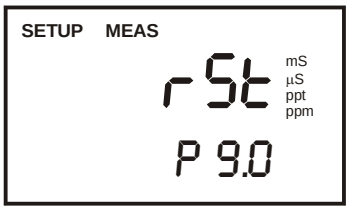
P7.0: Unit configuration

P7.1 READY indicator and auto endpoint function – select on or off
P7.2 Select °C or °F
P7.3 Select Automatic or Manual Temperature Compensation
P7.4 Setting TDS conversion factor



P8.0: Temperature

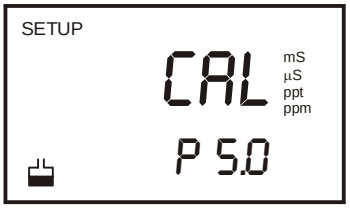
P8.1 Adjusting temperature coefficient
P8.2 Adjusting normalisation temperature



P9.0: Reset to factory defaults

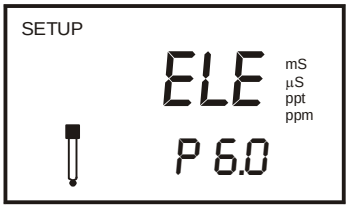
P9.1 Reset meter to factory defaults

SETUP in TDS Measurement Mode



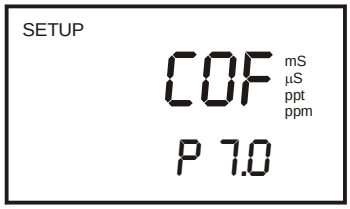
P5.0: View previous calibration data

P5.1 First range calibration point (0.00 – 9.99 ppm)
P5.2 Second range calibration point (0.0 – 99.9 ppm)
P5.3 Third range calibration point (0 – 999 ppm)
P5.4 Fourth range calibration point (0.00 – 9.99 ppt)
P5.5 Fifth range calibration point (0.0 – 200 ppt)



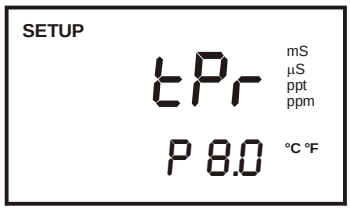
P6.0: View electrode data

P6.1 Effective cell constant for first range (0.00 – 9.99 ppm)
P6.2 Effective cell constant for second range (0.0 – 99.9 ppm)
P6.3 Effective cell constant for third range (0 – 999 ppm)
P6.4 Effective cell constant for fourth range (0.00 – 9.99 ppt)
P6.5 Effective cell constant for fifth range (0.0 – 200 ppt)



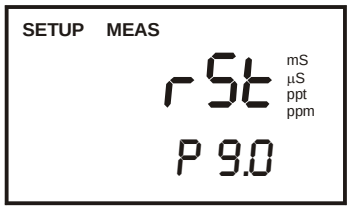
P7.0: Unit configuration

P7.1 READY indicator and auto endpoint function – select on or off
P7.2 Select °C or °F
P7.3 Select Automatic or Manual Temperature Compensation
P7.4 Setting TDS conversion factor.



P8.0: Temperature

P8.1 Adjusting temperature coefficient
P8.2 Adjusting normalisation temperature



P9.0: Reset to factory defaults

P9.0 Reset meter to factory defaults.

8.2 P1.0: Viewing previous pH calibration data

This mode lets you recall previous pH calibration data, which helps you know when to re-calibrate your meter. This is a “view-only” mode.

From measurement mode:

1. Press the MODE key to select pH measurement mode if necessary.
2. Press the SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P1.0.
4. Press the ENTER key repeatedly to view previous calibration data. See Figure 24.

	USA	NIST
• P1.1 =	pH 1.68	1.68
• P1.2 =	pH 4.01	4.01
• P1.3 =	pH 7.00	6.86
• P1.4 =	pH 10.01	9.18
• P1.5 =	pH 12.45	12.45

5. When you have scrolled through all calibration data, you will automatically return to the sub-group menu. Press CAL/MEAS key to return to measurement mode.

NOTES: *If there is no previous calibration data at a particular point, the primary display will show “----“.*

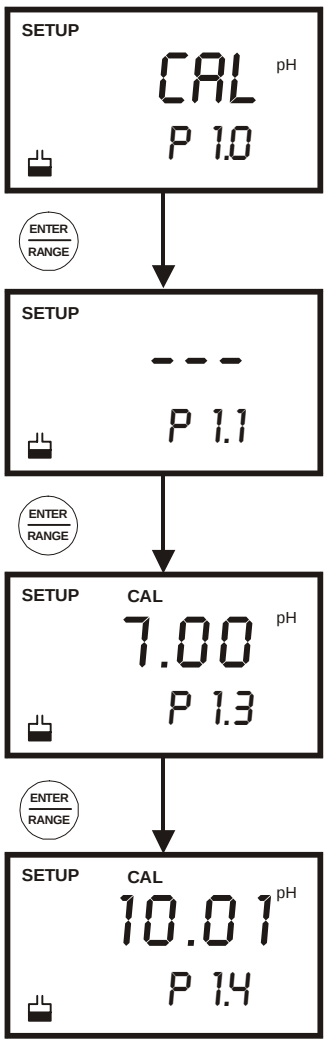


Figure 25: P1.0 - View calibration data for pH

8.3 P2.0: Viewing pH electrode data

Program 2 has two “view-only” options that let you check the electrode parameters for diagnostic purposes. It lets you view:

- P2.1 = Electrode offset
- P2.2 = Electrode slope

From pH measurement mode

1. Press the MODE key to select pH measurement mode.
2. Press the SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P2.0.
4. Press the ENTER key to select parameter 2.1.
5. The display shows the electrode offset value. It is the mV offset at pH 7.00. If you have not calibrated at any buffer, the primary display shows 0.00 mV.
6. Press the ENTER key to proceed to P2.2.
7. The display shows electrode slope in percentage. Slope displayed is the average slope based on the pH calibrations. Default setting is 100.0.
8. At any point, you can press the CAL/MEAS key to return to measurement mode.

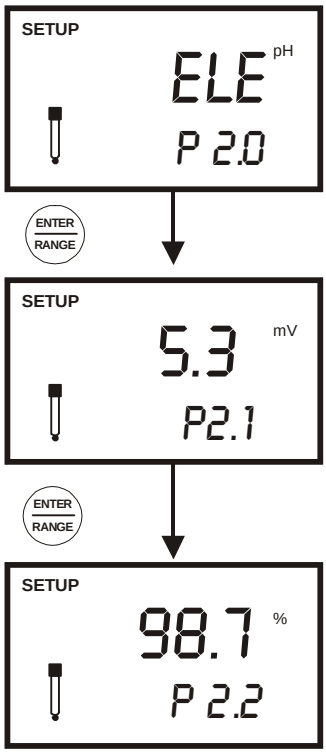


Figure 26: Viewing electrode's offset and slope status from pH measurement mode

8.4 P3.0: pH Measurement configuration

This sub-group program allows customising the meter to your specific needs. You can program the meter to:

1. Select READY indicator ON or OFF.
2. Select the number of pH calibration points.
3. Select between USA and NIST buffers.
4. Select between °C and °F units for temperature readings.

Figure 26 on the right shows the setup sequence for this program sub-group.

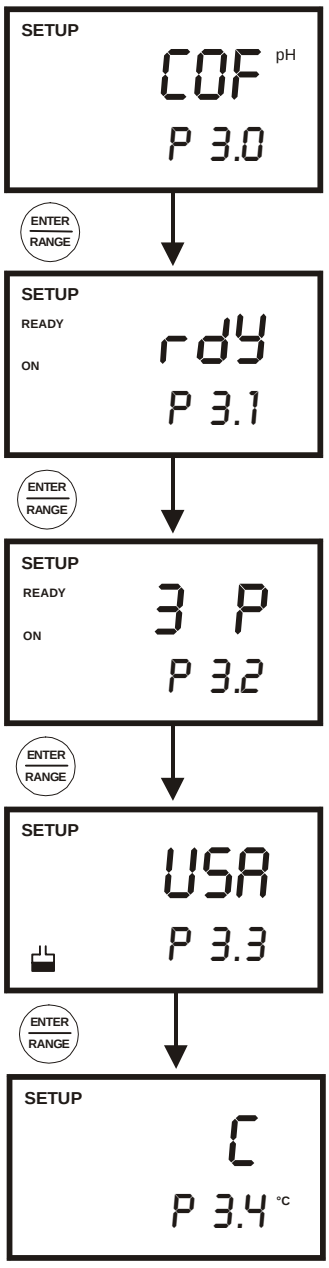


Figure 27: P3.0 - Unit configuration program

8.4.1 P3.1: READY Indicator and auto endpoint function

This program lets you select:

- **"<u>READY indicator on</u>"** to indicate when the reading is stable
- "**<u>READY indicator off</u>**" for faster meter response.
- **<u>Auto endpoint function on</u>**. Select auto endpoint on to "hold" the reading when it is stable for more than 5 seconds. The display automatically freezes, and the HOLD indicator appears on the left side of the display. Press the HOLD key to release the display and access other functions.

From measurement mode

1. Press the MODE key to select pH measurement mode.
2. Press SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P3.0.
4. Press the ENTER key to select parameter 3.1.
5. Press the ▲ or ▼ key to select the configuration you require.
   - OFF switches the READY indicator off.
   - ON switches the READY indicator on.
   - ON and HOLD together switches the auto endpoint feature on.
6. Press the ENTER key to confirm selection and to proceed to step 4 of P 3.2. Press the CAL/MEAS key to return to measurement mode.

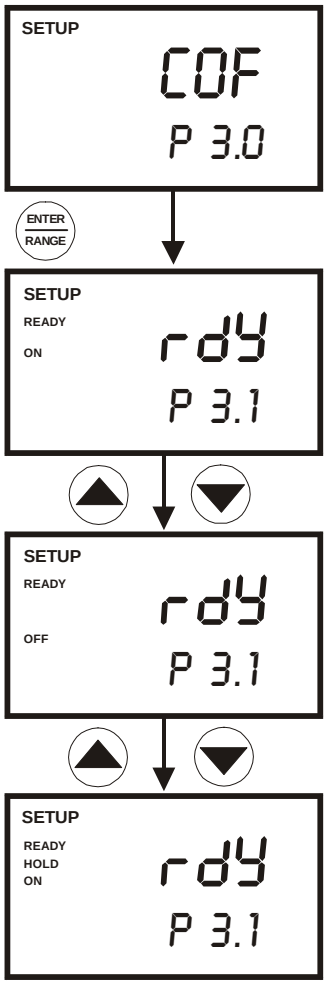


Figure 28: P3.1 - Selecting READY function

<u>NOTES</u>: *Meter default is set for READY indicator on and auto endpoint function off.*

You can also change the READY indicator and auto endpoint function in Program P7.1 (available from conductivity or TDS mode). Any changes you make to the READY indicator/auto endpoint function in pH mode will also change in conductivity mode.

8.4.2 P3.2: Selecting number of pH calibration points

Program P3.2 lets you select the number of calibration points that appear in pH calibration mode: 2, 3, 4 or 5. The meter will automatically exit calibration mode after you have calibrated to your selected number of points.

From measurement mode

1. Press the MODE key to select pH measurement mode.
2. Press SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P3.0.
4. Press the ENTER key twice to select parameter P3.2.
5. Press the ▲ or ▼ key to select 2, 3, 4 or 5 point pH calibration.
6. Press the ENTER key to confirm selection and proceed to step 4 of P3.3. Press CAL/MEAS key to return to measurement mode.

See Figure 28.

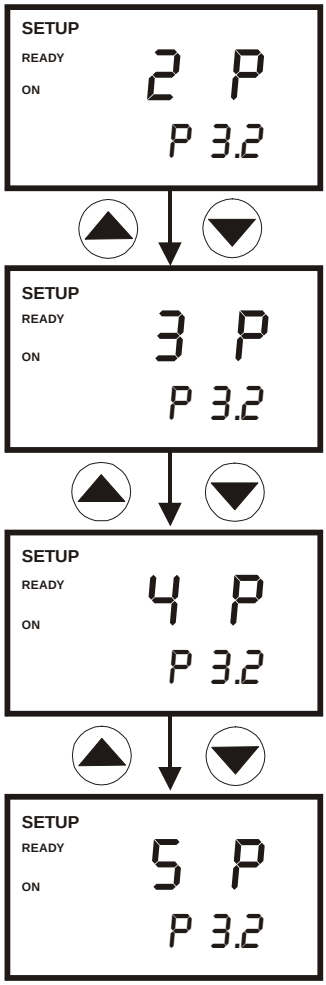


Figure 29: P3.2 - Select number of pH calibration points

8.4.3 P3.3 Selecting USA or NIST buffer

Program P3.3 lets you select between the following calibration buffer sets:

USA: pH 1.68, 4.01, 7.00, 10.01, 12.45
NIST: pH 1.68, 4.01, 6.86, 9.18, 12.45

Factory default is USA buffer set.

From measurement mode

1. Press the MODE key to select pH measurement mode.
2. Press SET key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through subgroups until you view parameter P3.0.
4. Press ENTER three times to select parameter P3.3.
5. Press the ▲ or ▼ key to toggle between USA and NIST buffer sets.
6. Press ENTER key to confirm selection and proceed to step 4 of P3.4. Press CAL/MEAS key to return to measurement mode.

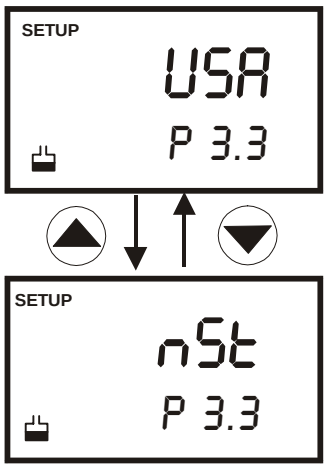


Figure 30: P3.3 - Select buffer set

8.4.4 P3.4 Selecting °C or °F

This meter lets you select between °C and °F units for temperature readings.

From measurement mode

1. Press the MODE key to select pH measurement mode.
2. Press SETUP key to enter Setup MODE.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P3.0.
4. Press the ENTER key four times to select parameter P3.4.
5. Press the ▲ or ▼ key to toggle between °C and °F.
6. Press the ENTER key to confirm selection and to return to the sub-group menu. Press the CAL/MEAS key to return to measurement mode.

NOTE: *You can switch between °C and °F in Program P7.2 (available from conductivity or TDS mode). If you switch between °C and °F in pH mode, the meter will also switch in conductivity or TDS mode.*

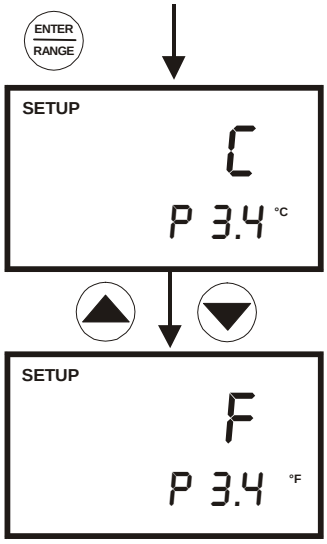


Figure 31: P3.4- Select temperature units

8.5 P4.0: Resetting to factory default settings (pH)

This program lets you reset all pH parameters to factory default settings. This clears all calibration data and any other pH setup functions you might have changed.

The following settings will remain as you have set them:

- Temperature unit of measure (°C or °F)
- The temperature offset calibration value
- All conductivity calibration data and parameters

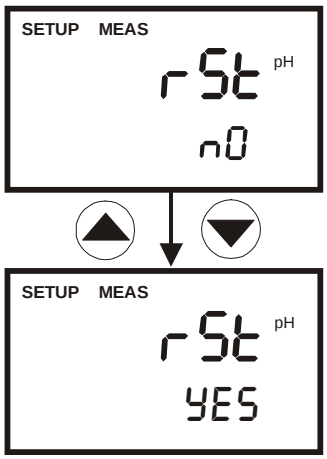


Figure 32: P4.0 - Reset to factory default values

From measurement mode

1. Press the MODE key to select pH measurement mode.
2. Press SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P4.0.
4. Press the ENTER key to enter parameter P4.0. See Figure 32.
5. Press the ▲ or ▼ to toggle between NO and YES.
   - NO retains current settings
   - YES resets to factory default settings
6. Press the ENTER key to confirm selection and to return to the measurement mode. Otherwise press CAL/MEAS key to return to measurement mode without resetting to factory default.

NOTE:

- *To clear all conductivity & TDS data, see page 38.*
- *See Addendum 4 on page 49 for a table of factory default settings.*

8.6 P5.0: Viewing previous conductivity calibration data

This mode lets you recall previous calibration data, which helps you know when to re-calibrate your meter. This is a “view-only” mode.

This function applies for conductivity & TDS mode.

From conductivity or TDS mode

1. Press the MODE key to select conductivity or TDS measurement mode.
2. Press the SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P5.0.
4. Press ENTER key repeatedly to view previous calibration data.
5. Each calibration data corresponds to each measurement range.
   - P5.1 = Range 1 (0.00 – 19.99 µS or 0.0 – 9.99 ppm)
   - P5.2 = Range 2 (0.0 – 199.9 µS or 0.0 – 99.9 ppm)
   - P5.3 = Range 3 (0 – 1999 µS or 0 – 999 ppm)
   - P5.4 = Range 4 (0.00 – 19.99 mS or 0.00 – 9.99 ppt)
   - P5.5 = Range 5 (0.0 – 199.9 mS or 0.0 – 99.9 ppt)
6. When you have scrolled through all calibration data, you will automatically return to the sub-group menu. Press CAL/MEAS key to return to measurement mode.

NOTE: *If there is no previous calibration data at a particular point, the primary display will show “----“.*

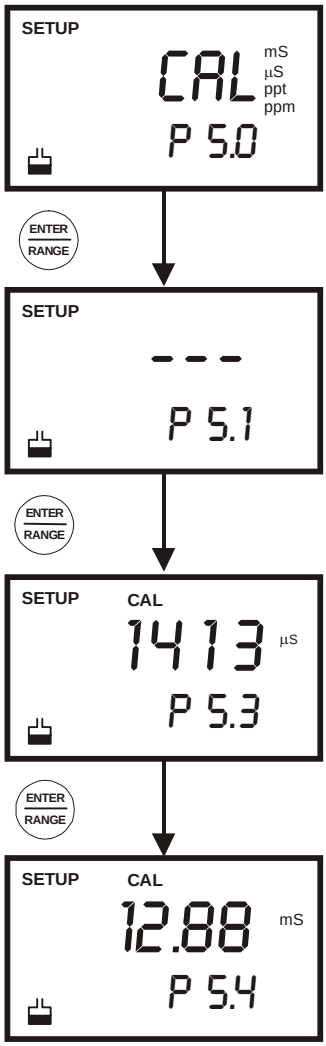


Figure 33: View calibration data in conductivity probe

8.7 P6.0: Viewing conductivity probe data

Program 6 has five “view-only” options that let you check the probe’s parameters for diagnostic purposes. These options show you the effective cell constant for each range. The cell constant adjusts according to your calibration.

This function applies for conductivity & TDS mode.

From conductivity or TDS measurement mode

1. Press the MODE key to select conductivity or TDS measurement mode.
2. Press the SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P6.0.
4. Press the ENTER key repeatedly to view the effective cell constant for each range.
   - P6.1 = Range 1 (0.00 – 19.99 µS or 0.00 – 9.99 ppm)
   - P6.2 = Range 2 (0.0 – 199.9 µS or 0.0 – 99.9 ppm)
   - P6.3 = Range 3 (0 – 1999 µS or 0 – 999 ppm)
   - P6.4 = Range 4 (0.00 – 19.99 mS or 0.00 – 9.99 ppt)
   - P6.5 = Range 5 (0.0 –199.9 mS or 0.0 – 99.9 ppt)
5. When you have scrolled through all probe data, you will automatically return to the sub-group menu. Press the CAL/MEAS key to return to measurement mode.

NOTE: *Cell constants will degrade with time and usage. You can use this feature to alert you to the need for a new probe prior to total failure.*

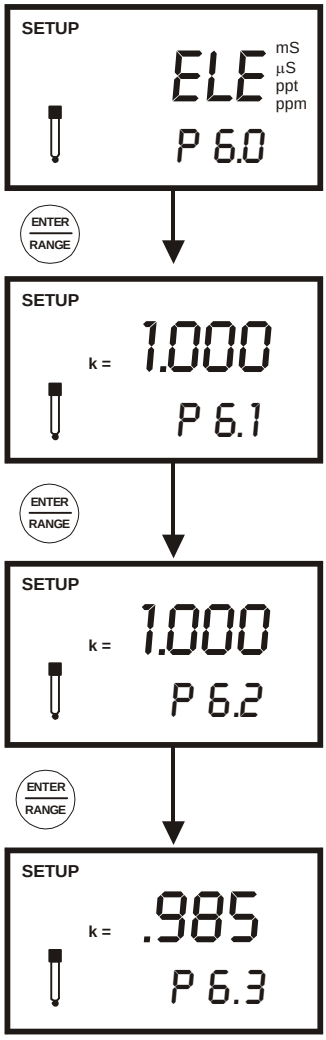


Figure 34: View probe data for each measurement range

8.8 P7.0: Conductivity or TDS measurement configuration

8.8.1 P7.1: READY indicator and auto endpoint function

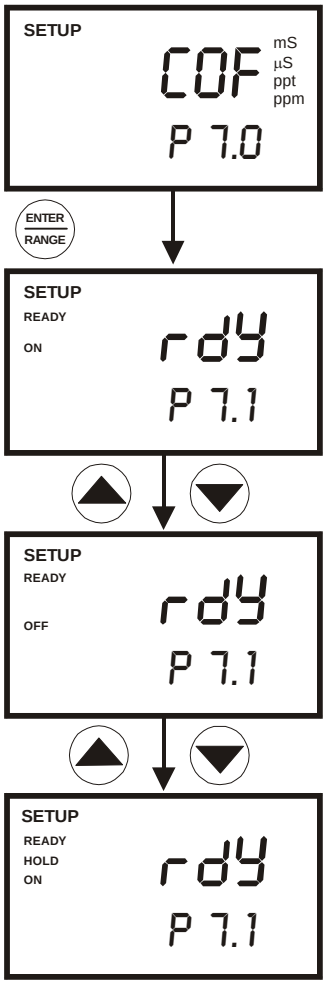


Figure 35: P3.1 - Selecting READY function

This program lets you select:

- **"<u>READY indicator on</u>"** to indicate when the reading is stable.
- **"<u>READY indicator off</u>"** for faster meter response.
- **<u>Auto endpoint function on</u>.** Select auto endpoint on to "hold" the reading when it is stable for more than 5 seconds. The display automatically freezes, and the HOLD indicator appears on the left side of the display. Press the HOLD key to release the display and access other functions.

From measurement mode

1. Press the MODE key to select conductivity or TDS measurement mode.
2. Press the SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P7.0.
4. Press ENTER key to select parameter P7.1.
5. Press the ▲ or ▼ key to select the configuration you require.
   - OFF switches the READY indicator off.
   - ON switches the READY indicator on.
   - ON and HOLD together switches the auto endpoint feature on.
6. Press ENTER key to confirm selection and to proceed to step 4 of P7.2. You can also press the CAL/MEAS key to return back to measurement mode.

<u>NOTE</u>: *Meter default is set for Ready indicator on, and auto endpoint function off.*

8.8.2 P7.2: Selecting °C or °F

You can select between °C and °F units for temperature readings. Meter default is °C.

From measurement mode

1. Press the MODE key to select conductivity measurement mode.
2. Press the SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P7.0.
4. Press the ENTER key two times to select parameter P7.2.
5. Press the ▲ or ▼ key to toggle between °C and °F.
6. Press the ENTER key to confirm selection and to proceed to step 4 of P7.3. Press the CAL/MEAS key to return to measurement mode.

NOTE: *You can switch between °C and °F in Program P3.4 (available from pH mode). If you switch between °C and °F in conductivity mode, the meter will also switch in pH mode.*

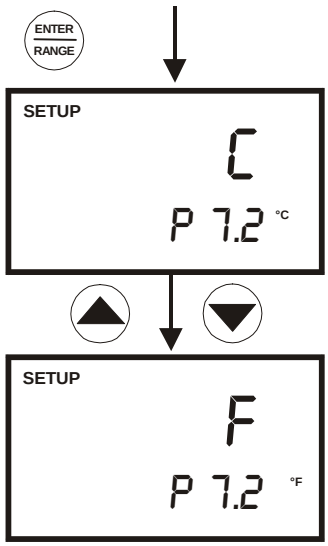


Figure 36: Change temperature measurement unit

8.8.3 P7.3: Selecting Automatic or Manual Temperature Compensation

This feature lets you select between Automatic Temperature Compensation (ATC) and Manual Temperature Compensation. Meter default is ATC.

From measurement mode

1. Press the MODE key to select conductivity measurement mode.
2. Press SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through the sub-groups until you view parameter P7.0.
4. Press the ENTER key three times to select parameter P7.3. The upper display shows “ATC” and the lower display shows “P7.3”.
5. Press the ENTER key again. The upper display shows “ATC” and the lower display shows “YES” or “NO”.
6. Press the ▲ or ▼ key to select the Automatic Temperature Compensation on or off.
   - YES = ATC on; NO = ATC off
7. Press the ENTER key to confirm selection and proceed to step 3 of P7.4. Press the CAL/MEAS key to return to measurement mode.

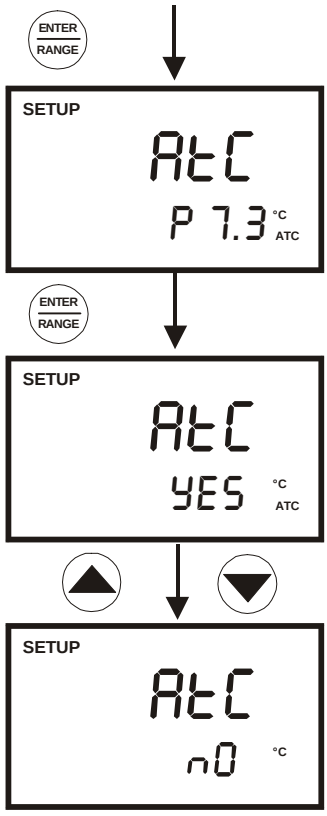


Figure 37: Selecting ATC ON or OFF

8.8.4 P7.4: Setting the TDS factor

The concentration of salts dissolved in solution increases the conductivity of that solution. This relationship varies from salt to salt and is roughly linear over a given range for a given salt. The TDS conversion factor is the number used by the meter to convert from conductivity to TDS.

To determine the conductivity to TDS conversion factor for your solution:

Addendum 1 and 2 on this sheet describes the conversion factors and how to calculate the TDS conversion factor for other solutions.

You can set the TDS conversion factor between 0.4 and 1.0; meter default is 0.5. When the factor is set to 1.0, conductivity = TDS.

From measurement mode

1. Press SETUP key to enter Setup mode.
2. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P7.0.
3. Press the ENTER key four times to select parameter P7.4. The upper display shows “tdS” and the lower display shows “P7.4”.
4. Press the ENTER key again. The upper display shows a value and the lower display shows “tdS”.
5. Calculate the TDS factor of your solution. See Addendum 2 on this sheet for information on how to calculate the TDS factor.
6. Press the ▲ or ▼ key to select your calculated TDS conversion factor.
7. Press the ENTER key to confirm selection and to return to the sub-group menu. Press the CAL/MEAS key to return to the measurement mode.

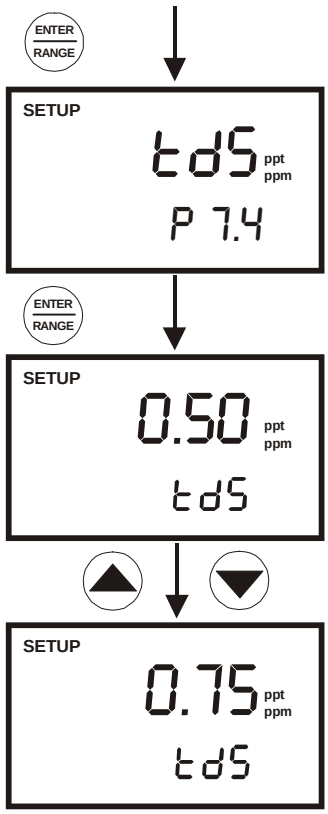


Figure 38: Change of TDS factor

8.9 P8.0: Temperature

8.9.1 P8.1: Selecting the temperature coefficient

The temperature coefficient is the amount of change in conductivity per degree of temperature; it is expressed in percent per °C. Entering the exact temperature coefficient of your solution lets you accurately compensate temperature for almost any solution*.

You can adjust 0.0 to 10.0% per °C. The meter default is 2.1% per °C. A temperature coefficient setting of 0.0% does not apply a correction factor to the reading for temperature.

From measurement mode

1. Press the MODE key to select conductivity measurement mode.
2. Press SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P8.0.
4. Press the ENTER key to select parameter P8.1. The display shows “t.CO” on the upper display.
5. Press the ENTER key again. The upper display shows the temperature coefficient and the lower display shows “t.CO”.
6. Press the ▲ or ▼ key to select the temperature coefficient of your solution.
7. Press the ENTER key to confirm selection and to proceed to step 3 of P8.2. Press the CAL/MEAS key twice to return to measurement mode.

NOTE: **If you do not know the temperature coefficient of your solution you can determine the correct value using the formula in Addendum 3 “Calculating Temperature Coefficients” on page 48.*

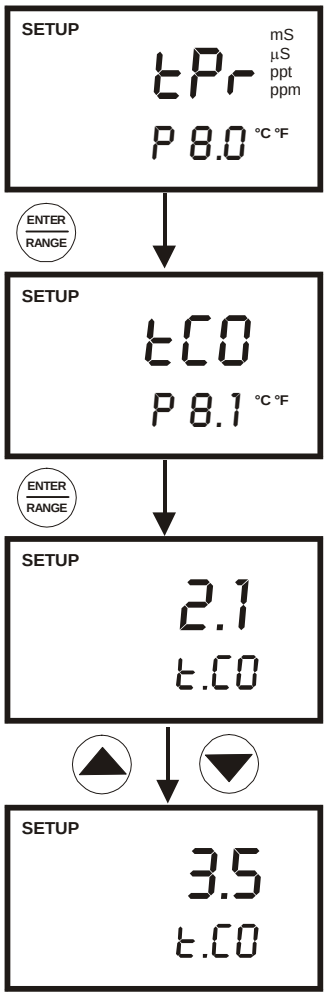


Figure 39: Changing the temperature coefficient

8.9.2 P8.2: Adjusting the normalisation temperature

Your meter will normalise its conductivity measurement to a standard temperature that you can select. This feature is useful if your samples are consistently at a temperature other than 25°C (77 °F). You can adjust the normalisation temperature from 15 to 30 °C (59 to 86 °F). Meter default is 25 °C (77 F). When using non-standard normalisation temperatures, it is important to calibrate to the value of your calibration standard at your normalisation temperature setting. From measurement mode

1. Press the MODE key to select conductivity measurement mode
2. Press SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P8.0.
4. Press the ENTER key two times to select parameter P8.2. The display shows “t.nr” on the upper display.
5. Press the ENTER key again. The upper display shows the normalisation temperature and the lower display shows “t.nr”.
6. Press the ▲ or ▼ key to select the normalisation temperature.
7. Press the ENTER key to confirm selection and to return to the sub-group menu. Press CAL/MEAS key to return to measurement mode.

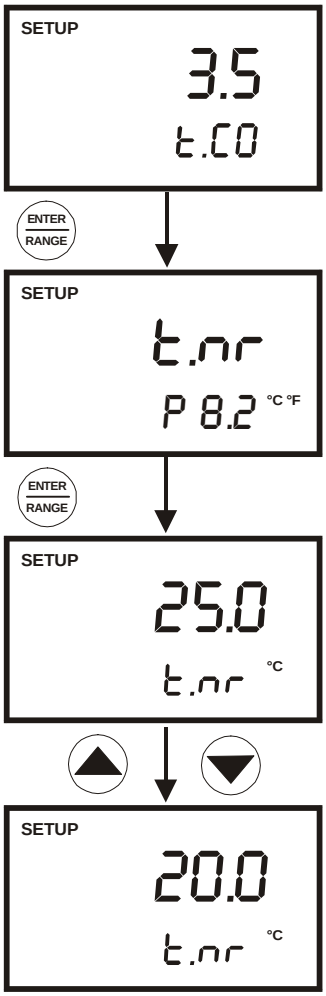


Figure 40: Adjusting the normalisation temperature

8.9.3 P9.0: Resetting to factory default settings (conductivity)

Program P9.0 lets you reset all parameters to factory default settings. This clears all calibration data and any other conductivity setup functions you might have changed.

From measurement mode

1. Press the MODE key to select conductivity measurement mode.
2. Press SETUP key to enter Setup mode.
3. Press the ▲ or ▼ key to scroll through sub-groups until you view parameter P9.0.
4. Press the ENTER key to enter parameter P9.0.
5. Press the ▲ or ▼ to toggle between NO and YES
   - NO retains current settings; YES resets to factory default settings.
6. Press the ENTER key to confirm selection and to return to the measurement mode. Otherwise press CAL/MEAS key to return to measurement mode without resetting to factory default.

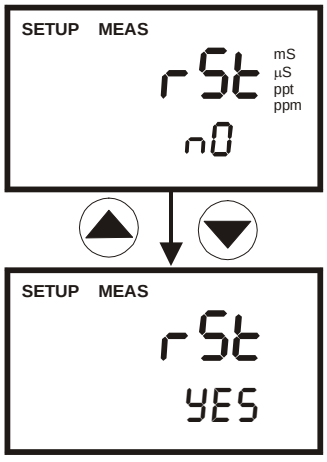


Figure 41: P9.0 - Reset to factory default values

NOTE: *To clear all pH data, see page 38. See Addendum 4 on page 49 for a table of factory default settings.*

9 PROBE CARE AND MAINTENANCE

9.1 pH Electrode care

Since your pH electrode is susceptible to dirt and contamination, clean as necessary depending on the extent and condition of use.

NOTE: *For specialty electrode care, consult your electrode instruction manual .*

pH electrode storage

For best results, keep the pH bulb hydrated. Use the protective electrode storage bottle or rubber cap filled with electrode storage solution to store your electrode. Alternatively, you can store in a pH 4 buffer with 1/100 part of saturated KCl. Other pH buffers are OK for short term storage, but NEVER use distilled water for storage.

After measuring

1. Rinse the pH electrode and reference junction in de-ionised water.
2. Store the electrode as recommended above in “pH electrode storage solution”, or as recommended by the manufacturer.
3. Prior to next use, rinse the liquid junction with de-ionised water and tap dry – never wipe electrode.

NOTE: *If this does not restore electrode to normal response, see “Reactivating the pH electrode” section below.*

pH electrode cleaning

- Salt deposits: Dissolved the deposits by immersing the electrode in tap water for ten to fifteen minutes. Then thoroughly rinse with distilled water.
- Oil/Grease film: Wash electrode pH bulb gently in some detergent and water. Rinse electrode tip with distilled water or use a general purpose electrode cleaner (see ordering information).
- Clogged reference junction: Heat a diluted KCl solution to 60 to 80 °C. Place the sensing part of the electrode into the heated solution for about 10 minutes. Allow the electrode to cool in some unheated KCl solution.
- Protein deposits: Prepare a 1% pepsin solution in 0.1 M of HCl. Set the electrode in the solution for five to ten minutes. Rinse the electrode with distilled water.

Reactivating the pH electrode

If stored and cleaned properly, your pH electrode should be ready for immediate use. However, a dehydrated bulb may cause sluggish response. To rehydrate the bulb, immerse the electrode in a pH 4 buffer solution for 10 to 30 minutes. If this fails, the electrode requires activation. Never touch or rub glass bulb. Contact builds up an electro-static charge.

pH electrode activation (for glass body electrodes only)

WARNING: Only qualified persons with proficient with the safe handling of dangerous chemicals should perform the procedure below. Provide proper containers, fume hoods, ventilation and waste disposal. Safety goggles and protective clothing must be worn while performing this procedure. If possible, replace with another electrode instead of performing this re-activation procedure.

1. Dip or stir the pH electrode in alcohol for 5 minutes.
2. Leave the electrode in tap water for 15 minutes.
3. Dip and stir the electrode in concentrate acid (such as HCl or H2SO4) for 5 minutes.
4. Repeat Step 2.
5. Dip and stir in strong base (NaOH) for 5 minutes.
6. Leave for 15 minutes in tap water.
7. Now test with standard calibration buffer solutions to see if the electrode yields acceptable results. You may repeat step 3 through 6 up to three times for better response. If the response does not improve, then your electrode is no longer functioning. Replace with a new electrode – call your distributor for information.

9.2 Conductivity electrode

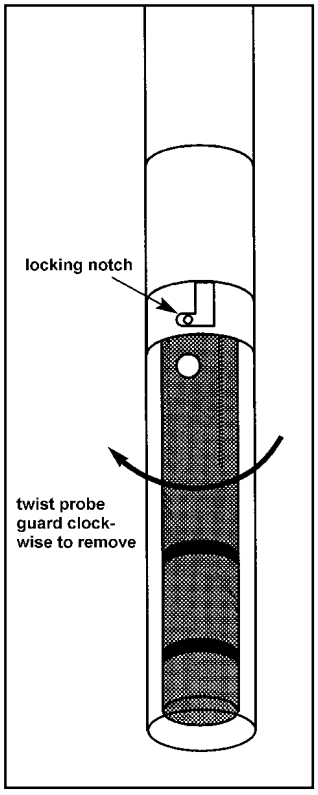
Keep the conductivity probe clean. Rinse the probe twice and gently swirl it while you take readings. For best accuracy, soak a dry probe for at least 5 to 10 minutes or longer before calibration. Rinse the probe with de-ionised or tap water before storing. Never scratch the bands with a hard substance. Do not strike the probe against any hard surface.

Do not immerse the probe in oily solutions. Clean the electrode thoroughly by stirring it in a mild detergent bath or isopropyl alcohol. Wipe the probe with a soft tissue paper. Rinse thoroughly in tap water and then in de-ionised water. Re-calibrate the meter after cleaning the probe.

The conductivity probe included with your meter features a removable probe guard for easy cleaning.

To remove probe guard:

1. Grip yellow probe guard and twist clockwise. The locking notch will release.
2. Slide probe guard off end of probe.



10 TROUBLE SHOOTING GUIDE

Problem	Cause	Solution
Press 'ON' key but no display.	a) AC outlet power not is switched on.	a) Switch on the power supply.
	b) DC adapter socket is not properly inserted.	b) Re-insert DC adapter socket.
Not responding to key press.	a) HOLD mode in operation.	a) Cancel HOLD mode by pressing Hold key.
	b) Damaged keypad.	b) Return to dealer.
	c) Internal program error.	c) Reset all internal programs by re-inserting the power socket.
Unstable readings.	a) Air bubbles in probe.	a) Tap probe to remove bubbles.
	b) Dirty probe.	b) Clean the probe and recalibrate.
	c) Probe not deep enough in sample.	c) Make sure sample entirely covers the probe sensors.
	d) External noise pickup or induction caused by nearby electric motor.	d) Move or switch off interfering motor.
	e) Broken probe.	e) Replace probe.
"OR" on upper display.	a) Probe is shorted.	a) Test probe. Make sure probe is fully connected to meter.
	b) Probe is in an out-of-range solution.	b) Use different solution.
	c) Broken probe.	c) Replace probe.
Temperature reading erratic or lower display reads "OR"	a) Temperature of solution is out of range.	a) Heat or cool solution.
Slow response	a) Dirty/Oily probe.	a) Clean probe. See " Probe Care and Maintenance", page 39.

11 ERROR MESSAGES

LCD Display	Indicates	Cause	Solution
Err annunciator.	Unrecognised input from keypad.	Wrong input in selected mode.	Release key. Select valid operations depending on mode.
CAL & Err annunciators on / Buffer and electrode indicators blink.	Calibration error.	Wrong value input at calibration. Dirty probe.	Check your input value, clean probe. See Calibration section or Probe Maintenance section.

If an error persists, or the meter shows incorrect values, return the meter. See “Warranty” and “Return of Items” on page 51.

For a complete diagram of the display, see page 4.

12 SPECIFICATIONS

Mode	pH	Temperature	Conductivity	TDS	mV
Range	-2.00 to 16.00 pH	-10.0 to 110.0 °C (14 to 230 °F)	0 to 19.99 µS 0 to 199.9 µS 0 to 1999 µS 0 to 19.99 mS 0 to 199.9 mS	0 to 9.99 ppm 0 to 99.9 ppm 0 to 999 ppm 0 to 9.99 ppt 0 to 99.9 ppt Max. of 199.9 ppt based on factor setting	-600 to +600 mV
Resolution	0.01 pH	0.1 °C (0.1 °F)	0.01 µS 0.1 µS 1 µS 0.01 mS 0.1 mS	0.01 ppm 0.1 ppm 1 ppm 0.01 ppt 0.1 ppt	0.1 mV (-199.99 to +199.9 mV) 1 mV (beyond ± 199.9 mV)
Accuracy	±0.01 pH	+0.5 °C (±0.9 °F)	±1% Full Scale + 1 digit	±1% Full Scale + 1 digit	±0.2 mV (-199.9 to +199.9 mV) ±2 mV (beyond ±199.9 mV)
Calibration	Up to 5 points, with automatic buffer recognition	Offset in 0.1 °C increments	Up to 5 points (one point per range)	Up to 5 points (one point per range)	
pH Buffer Option	USA (pH 1.68, 4.01, 7.00, 10.01,12.45) NIST (pH 1.68, 4.01, 6.86, 9.18, 12.45)				
pH Slope & Offset Display	Yes				
Conductivity Cell constant (k)			1.0	1.0	
Conductivity Temperature Coefficient			0.0 to 10.0% per °C	0.0 to 10.0% per °C	
Normalisation Temperature			15.0 to 30.0 °C (adjustable)	15.0 to 30.0 °C (adjustable)	
TDS Conversion Factor				0.4 to 1.0	
Auto-ranging			Yes	Yes	
Inputs	BNC	6-pin round connector	6-pin round connector	6-pin round connector	BNC
Temperature Compensation	Automatic / Manual from 0 to 100 °C				
Operating Temperature	0 to 50 °C				
HOLD function	Yes				
Averaging / Stability (READY) / Auto-hold	Yes				
Display	Custom Dual LCD				
Power	9 V DC adapter (110 V AC / 230 V AC)				
Dimensions / Weight	Meter (with electrode arm): 18 x 23 x 6 cm; 950 g Boxed: 40 x 26 x 9 cm; 1650 g				

13 ACCESSORIES

Replacement Meter and Meter accessories

Eutech Instruments

Item Description	Eutech Instruments Order Code No.
PC 510 meter, pH electrode (EC-FC72522-01B), conductivity/temp probe (EC-CONSEN91W) and integral electrode stand.	EC-PC510/03S
PC 510 meter, pH electrode (EC-FC72522-01B), conductivity/temp probe (EC-CONSEN91W), integral electrode stand and 110 VAC power adapter.	EC-PC510/13S
PC 510 meter, pH electrode (EC-FC72522-01B), conductivity/temp probe (EC-CONSEN91W), integral electrode stand and 220 VAC power adapter.	EC-PC510/23S
Plastic-body double-junction pH combination electrode (1 meter cable)	EC-FC72522-01B
Epoxy-body single-junction pH electrode (3 ft cable)	EC-FC72521-01B
Ultem-body, conductivity/temperature electrode, k=1.0, 1 m cable	EC-CONSEN91W
Temperature probe, stainless steel, 6 pin connector	EC-PHWPTEM01W
“3-in-1” pH/Temperature, combination epoxy-body, sealed, single-junction, electrode, 120 mm x 12 mm diameter, 1 m cable	EC-FE73528-01W
AC/DC power adapter (120 V AC, 50/60 Hz)	EC-120-ADA
AC/DC power adapter (220 V AC, 50/60 Hz)	EC-220-ADA

Oakton Instruments

Item Description	Oakton Instruments Order Code No.
PC 510 meter, pH electrode (35641-51), ,conductivity/temp probe (35608-50), integral electrode stand, (110 & 220 VAC Adapters)	35610-10
PC 510 meter, “3-in-1” pH electrode (35808-71), ,conductivity/temp probe (35608-50), integral electrode stand, (110 & 220 VAC adapters)	35610-11
PC 510 meter, integral electrode stand, 110 & 220 VAC adapters.	35610-12
Plastic-body double-junction pH combination electrode (1 meter cable)	35641-51
Epoxy-body single-junction pH electrode (3 ft cable)	35801-00
Ultem-body, conductivity/temperature electrode, k=1.0, 1 m cable	35608-50
Temperature probe, stainless steel, 6 pin connector	35618-05
“3-in-1” pH/Temperature, combination epoxy-body, sealed, single-junction, electrode, 120 mm x 12 mm diameter, 1 m cable	35808-71
“3-in-1” pH/Temperature combination epoxy-body, sealed, double-junction, electrode, 120 mm x 12 mm diameter, 1 m cable	35808-72
AC/DC power adapter (120 V AC, 50/60 Hz)	35615-07
AC/DC power adapter (220 V AC, 50/60 Hz)	35615-08

Calibration Solutions

Item	Eutech Instruments Ordering Code	Oakton Instruments Ordering Code
pH 4.01 buffer solution, 480 mL bottle (1 pint)	EC-BU-4BT	00654-00
pH 7.00 buffer solution, 480 mLmL bottle (1 pint)	EC-BU-7BT	00654-04
pH 10.01 buffer solution, 480 mLmL bottle (1 pint)	EC-BU-10BT	00654-08
pH 4.01 buffer sachets, 20 mL x 20 pcs.	EC-BU-4BS	35653-01
pH 7.00 buffer sachets, 20 mL x 20 pcs.	EC-BU-7BS	35653-02
pH 10.01 buffer sachets, 20 mL x 20 pcs.	EC-BU-10BS	35653-03
12.88 mS Calibration Solution in 480-mLL bottle (1 pint)	EC-CON-1288BT	00606-10
2,764 µS Calibration Solution in 480-mL bottle (1 pint)	EC-CON-2764BT	00653-20
10 µS conductivity standard pouch (20 units x 20 mL per box)mL	EC-CON-10BS	35653-09
447 µS Conductivity pouch (20 units x 20 mL per box)	EC-CON-447BS	35653-10
1,413 µS Conductivity pouch (20 units x 20 mL per box)	EC-CON-1413BS	35653-11
2,764 µS Conductivity pouch (20 units x 20 mL per box)	EC-CON-2764BS	35653-12
15,000 µS Conductivity pouch (20 units x 20 mL per box)	EC-CON-15000BS	35653-13

Note:

pH buffer solutions have ±0.01 pH accuracy at 25 ℃. Conductivity standard solutions have ±1% accuracy at 25 ℃. Pouches contain 20-mL calibration solution in individually sealed, single-use packets

14 ADDENDUM 1: CONDUCTIVITY TO TDS CONVERSION FACTORS

1. Factor – the conductivity to ppm TDS conversion factor. Multiply conductivity by this factor to get ppm TDS for the type of TDS reading needed.
2. 442 – a formulation that most closely represents the conductivity to ppm relationship, on average, for naturally occurring fresh water. (**4**0% $NaSO_4$, **4**0% $NaHCO_3$, **2**0% NaCl)
3. TDS Your Material – These columns are for you to write in your application-specific conductivity-to-ppm values and conversion factors for future reference.

Factor = Actual TDS ÷ Actual Conductivity @ 25 °C

Conductivity at 25 °C	TDS KCl		TDS NaCl	
	ppm Value	Factor	ppm Value	Factor
84 µS	40.38	0.5048	38.04	0.4755
447 µS	225.6	0.5047	215.5	0.4822
1413 µS	744.7	0.5270	702.1	0.4969
1500 µS	757.1	0.5047	737.1	0.4914
8974 µS	5101	0.5685	4487	0.500
12,880 µS	7447	0.5782	7230	0.5613
15,000 µS	8759	0.5839	8532	0.5688
80 mS	52,168	0.6521	48,384	0.6048

Conductivity at 25 °C	TDS 442		TDS Your Material	
	ppm Value	Factor	ppm Value	Factor
84 µS	50.50	0.6563		
447 µS	300.0	0.6712		
1413 µS	1000	0.7078		
1500 µS	1050	0.7000		
8974 µS	7608	0.8478		
12,880 µS	11,367	0.8825		
15,000 µS	13,455	0.8970		
80 mS	79,688	0.9961		

15 ADDENDUM 2: CALCULATING TDS CONVERSION FACTORS

You can calibrate your meter using TDS calibration standard solutions. The calibration standard only needs to give the TDS value at a standard temperature such as 25 °C. To determine the conductivity-to-TDS conversion factor use the following formula:

Factor = Actual TDS ÷ Actual Conductivity @ 25 °C

Definitions:

- Actual TDS: Value from the solution bottle label or as a standard you make using high purity water and precisely weighed salts.
- Actual Conductivity: Value measured using a properly calibrated Conductivity/Temperature meter.

Both the Actual TDS and the Actual Conductivity values must be in the same magnitude of units. For example, if the TDS value is in ppm the conductivity value must be in μS; if the TDS value is in ppt the conductivity value must me in mS.

Check your factor by multiplying the conductivity reading by the factor in the above formula. The result should be in TDS value.

16 ADDENDUM 3: STANDARD pH BUFFERS

The following table shows the various pH values at different temperature of the solution during calibration. The table also illustrates why a calibration value may be different from the buffer value at 25 °C.

Temperature	USA Buffer					NIST Buffer				
(°C)	pH 1.68	pH 4.01	pH 7.00	pH 10.01	pH 12.45	pH1.68	pH 4.01	pH 6.86	pH 9.18	pH 12.45
0	1.67	4.01	7.12	10.32	13.43	1.67	4.01	6.98	9.47	13.43
5	1.67	4.01	7.09	10.25	13.21	1.67	4.01	6.95	9.38	13.21
10	1.67	4.00	7.06	10.18	13.00	1.67	4.00	6.92	9.32	13.00
15	1.67	4.00	7.04	10.12	12.81	1.67	4.00	6.90	9.27	12.81
20	1.68	4.00	7.02	10.06	12.63	1.68	4.00	6.88	9.22	12.63
25	1.68	4.01	7.00	10.01	12.45	1.68	4.01	6.86	9.18	12.45
30	1.69	4.01	6.99	9.97	12.29	1.69	4.01	6.85	9.14	12.29
35	1.69	4.02	6.98	9.93	12.13	1.69	4.02	6.84	9.10	12.13
40	1.70	4.03	6.97	9.89	11.99	1.70	4.03	6.84	9.07	11.99
45	1.70	4.04	6.97	9.86	11.84	1.70	4.04	6.83	9.04	11.84
50	1.71	4.06	6.97	9.83	11.70	1.71	4.06	6.83	9.01	11.70
55	-	4.08	6.97	9.81	-	-	4.08	6.83	8.99	-
60	-	4.10	6.98	9.79	-	-	4.10	6.84	8.96	-
70	-	4.12	6.99	9.76	-	-	4.12	6.85	8.92	-
80	-	4.16	7.00	9.74	-	-	4.16	6.86	8.89	-
90	-	4.20	7.02	9.73	-	-	4.20	6.88	8.85	-

17 ADDENDUM 4: CALCULATING TEMPERATURE COEFFICIENTS

To determine the temperature coefficient of your sample solution use this formula:

$$\mathbf{tc} = \mathbf{100} \times \frac{C_{T2} - C_{T1}}{C_{T1}(T_2 - 25) - C_{T2}(T_1 - 25)}$$

Where:

tc = Temperature coefficient	25 = 25 °C
C_{T1} = Conductivity at Temp 1	C_{T2} = Conductivity at Temp 2
T_1 = Temp 1	T_2 = Temp 2

NOTE: A controlled temperature water bath is ideal for this procedure.

1. Immerse the probe into a sample of your solution and adjust the temperature coefficient to 0% (that is, no compensation) by performing the following:
   A. From measurement mode, press the SETUP key to enter Setup mode.
   B. Press the ▲ or ▼ key until the lower display reads P8.0.
   C. Press the ENTER key twice. The lower display reads tCO and the upper display shows the temperature coefficient value.
   D. Press the ▼ key until the upper display shows 0.0.
   E. Press ENTER key to confirm the value.
   F. Press CAL/MEAS key twice to return to measurement mode
2. Wait for 5 minutes. Note T_1 and C_{T1} (conductivity at T_1).
3. Condition the sample solution and probe to a temperature (T_2) that is about 5 °C to 10 °C different from T_1, and note the conductivity reading C_{T2}.

   NOTE: Record your results for future reference. Ideally T_1 and T_2 should bracket your measurement temperature, and should not be different by more than 5 °C.
4. Calculate the temperature coefficient of your solution according to the formula shown above.
5. Enter the temperature coefficient you calculated into the meter.
   A. From measurement mode, press the SETUP key to enter Setup mode.
   B. Press the ▼ key until the lower display reads P8.0.
   C. Press the ENTER key twice. The lower display reads tCO and the upper display shows the temperature coefficient value (should be 0, as per step 1 above).
   D. Press the ▲ key until the upper display shows your calculated temperature coefficient.
   E. Press ENTER key to confirm the value.
   F. Press CAL/MEAS key twice to return to measurement mode.

The calculated temperature coefficient will not be applied to all the meter readings.

18 ADDENDUM 5: METER FACTORY DEFAULT SETTINGS

Resetting the meter to factory default settings clears all calibration data and most other setup functions you might have changed. The following settings will remain as you have set them:

- Temperature unit of measure (°C or °F)
- The temperature offset calibration value.

NOTE: Conductivity and pH data are cleared separately from each other.

- To clear pH data, see Sub group P4.0.
- To clear conductivity/TDS data, see Sub group P9.0.

Type	Parameter	Default	Remarks
pH parameters			
P1.1	View pH calibration data	----	No calibration data for 1st buffer, pH 1.68
P1.2		----	No calibration data for 2nd buffer, pH 4.01
P1.3		----	No calibration data for 3rd buffer, pH 7.00 or 6.86
P1.4		----	No calibration data for 4th buffer, pH 10.01 or 9.18
P1.5		----	No calibration data for 5th buffer, pH 12.45
P2.1	View electrode offset	0.00 mV	No offset adjustment
P2.2	View electrode slope	100.0%	No slope adjustment
P3.1	Ready indicator	Ready on	Ready indicator on; auto endpoint off
P3.2	# pH calibration points	3	3 pH calibration points available (1 – 5 pt range)
P3.3	Buffer set option	USA	USA or NIST buffer set
P3.4	°C or °F	No default	°C or °F remains as selected
P4.0	pH factory default	No	Retains your current settings
Conductivity and TDS parameters			
P5.1	Viewing conductivity or TDS	----	No calibration data for range 1
P5.2	calibration data	----	No calibration data for range 2
P5.3		----	No calibration data for range 3
P5.4		----	No calibration data for range 4
P5.5		----	No calibration data for range 5
P6.1	Viewing conductivity or TDS	1.0	No offset for effective cell constant for range 1
P6.2	calibration data	1.0	No offset for effective cell constant for range 2
P6.3		1.0	No offset for effective cell constant for range 3
P6.4		1.0	No offset for effective cell constant for range 4
P6.5		1.0	No offset for effective cell constant for range 5
P7.1	Ready indicator	Ready on	Ready indicator on; auto endpoint off
P7.2	°C or °F	No default	°C or °F remains as selected
P7.3	ATC on or off	ATC on	----
P7.4	TDS factor	0.5	Adjustable from 0.4 to 1.0
P8.1	Temperature coefficient	2.1% per °C	Adjustable from 0 to 10%
P8.2	Normalisation temperature	25 °C	Adjustable from 15 to 30 °C
P9.0	Conductivity factory default	No	Retains your current settings

19 WARRANTY

The PC510 bench meter is supplied with a **3-year** warranty from manufacturing defects and electrodes for **6 months** from the date of purchase.

If repair or adjustment is necessary and has not been the result of abuse or misuse within the designated period, please return – freight pre-paid – and correction will be made without charge. Eutech Instruments/ Oakton Instruments will determine if the product problem is due to deviations or customer misuse.

Out of warranty products will be repaired on a charged basis.

Exclusions

The warranty on your instrument shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer
- Unauthorised modification or misuse
- Operation outside of the environment specifications of the products

20 RETURN OF ITEMS

Authorisation must be obtained from our Customer Service Department or authorised distributor before returning items for any reason. A “Return Goods Authorisation” (RGA) form is available through our Authorised Distributor. Please include data regarding the reason the items are to be returned. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Eutech Instruments/ Oakton Instruments will not be responsible for damage resulting from careless or insufficient packing. A restocking charge will be made on all unauthorised returns.

NOTE: Eutech Instruments Pte Ltd/ Oakton Instruments reserves the right to make improvements in design, construction, and appearance of products without notice.

For more information on Eutech Instruments/ Oakton Instruments' products, contact your nearest distributor or visit our website listed below:

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